May 31, 1943

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1982

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NEW Speed Nuts

Keeping Pace with Design Changes

Hundreds of new Speed Nut designs have already saved millions of man-hours in the assembly of cables, tubing, switches, name plates, dials, panels, sheets, lights, conduit, wire harnesses, junction and terminal boxes, take-out plates, rolled sections, plywood structures and countless other parts. Using MORE SPEED NUTS will do the same for you NOW and help you improve the assembly of your postwar products. First step is to send us your details today.

Speed Nut System

TINNERMAN PRODUCTS INC. · 2039 Fulton Rd., Cleveland, Ohio

IN CANADA: Wallace Barnes Co., Ltd., Hamilton, Ontario · IN ENGLAND: Simonds Accessories, Ltd., London

FASTEST THING IN FASTENINGS!

FOR BEADED EXTRUSIONS · FOR ROLLED SECTIONS · FOR PLYWOOD · SPEED NUT ANGLES · SPEED NUTS FOR CONDUIT CLAMPS · FOR BOX COVERS

Those Supplies You're Thinking About *Today*

Your I. S. D.* may have ordered on high priority *Last Month!*

Your Purchasing Department may be short-handed. Your Expeditors may be run ragged. But your *Industrial Supply Distributor is on the job—capable as ever, ready to help. *Are you using him enough?*

He knows what you need—the whole range from grommets to forge hammers. He knows where he can get them—he has many sources of supply. He buys more often than not on high priority. He orders in big lots—as often as he can, and as much as he can get. He buys for stock—in normal times he carries as many as 25,000 to 50,000 individual items.

It will pay you always to inquire of your Industrial Supply Distributor before you send directly to the factory—he may have anticipated you by ordering last month or the month before the very things you need tomorrow. Thus you avoid duplication, confusion, scattered effort. Telephone your Distributor FIRST! And save yourself both time and expense.

Your Distributor is your dependable supplier of Cle-Forge High Speed Drills, Peerless High Speed Reamers, and other cutting tools that we manufacture.

TRADE MARK REG. U.S. PAT. OFF.

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The CLEVELAND TWIST DRILL COMPANY
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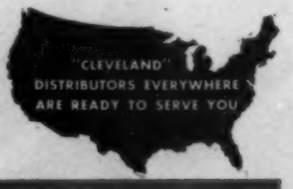


HOT JAVA in Iceland...

from a zinc coated STEEL CUP

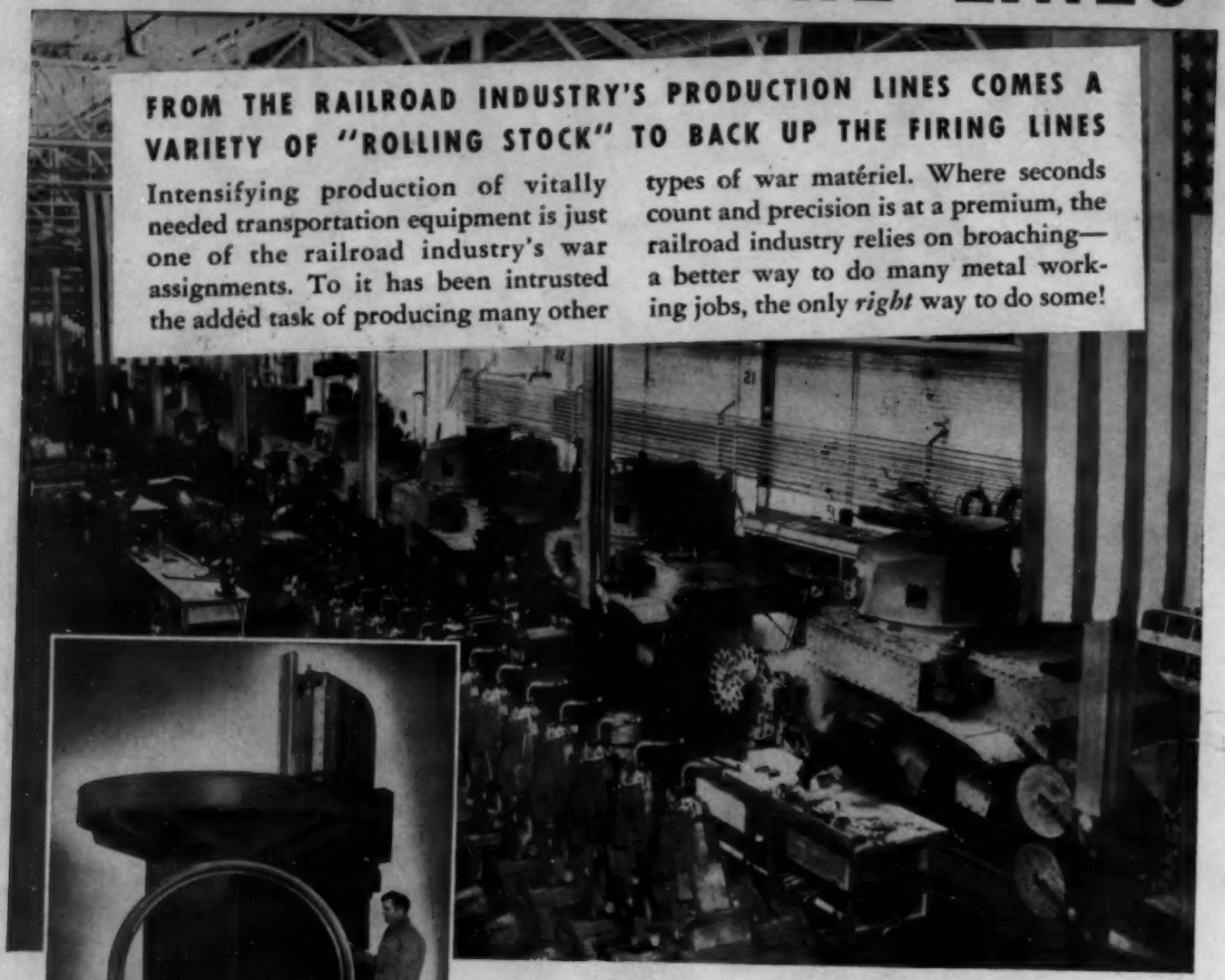
When you compare a canteen cup or mess-kit with a tank, the eating utensil seems piddling and insignificant. But multiply it by an 8,000,000-man army and you immediately see that a large tonnage of steel is involved.

It's special steel, too. Made in deep-drawing quality, so that a canteen-cup can be pressed out of a flat circular disc (rolled rim, kidney shape and all). Bethlehem is supplying mess-kit manufacturers with this special deep-drawing steel in substantial quantities. This is just one more example of the many calls nowadays on Bethlehem's sheet-steel capacity, both for direct war equipment and for supplementary jobs on the working front.

BETHLEHEM STEEL SHEETS

BETHLEHEM STEEL ★ ★ ★

LINES BEHIND THE LINES



FROM THE RAILROAD INDUSTRY'S PRODUCTION LINES COMES A VARIETY OF "ROLLING STOCK" TO BACK UP THE FIRING LINES

Intensifying production of vitally needed transportation equipment is just one of the railroad industry's war assignments. To it has been intrusted the added task of producing many other types of war matériel. Where seconds count and precision is at a premium, the railroad industry relies on broaching—a better way to do many metal working jobs, the only *right* way to do some!

This big tank turret gear, taller than a six-foot man, is economically and automatically broached on an *American* surface broaching machine. No special skill is needed. One operator, one machine, and tooling by *American*—equal a precision job at a production rate!

Three internal teeth are cut and finished with each pass of the tool. At completion of the stroke the broach is hydraulically withdrawn from the cut, and the gear is indexed to next working position during the upward stroke. When the 348 teeth are finished the machine automatically stops, permitting easy and rapid reloading of a new blank.

BROACHING IS BETTER THE *American* WAY

American
BROACH AND MACHINE CO.

ANN ARBOR, MICHIGAN

•

BROACHING MACHINES
PRESSES
BROACHING TOOLS
SPECIAL MACHINERY

DIVISION OF

MACKLIN GRINDING WHEELS

HELPFUL HINTS

and

Safety Suggestions

YOU MEAN YOU SHOULD "TRUE" THE WHEEL FROM THE CENTER?
HEY! DONT TRY TO REMOVE ALL THE STOCK IN ONE PASS
Operators are often tempted to remove too much stock in one pass on the work. This causes the grinding wheel to break down too quickly, resulting in uneven wear and unsatisfactory finish.
[31]

GET YOUR COPIES OF THIS FREE BOOK

Many of the larger as well as the smaller users of grinding wheels have found this 64 page booklet so valuable that they have requested as many as 100 copies for distribution through their grinding departments.

Comments with requests for additional copies have been highly enthusiastic on the instructive value of the contents.

Already in its second printing, this illustrated booklet contains *Know How* facts invaluable as an aid in the operation and care of grinding wheels, and particularly for the instruction of new grinder hands. Do not hesitate to call on us for an adequate number of copies to cover your needs.

★

INVEST IN WAR BONDS

MACKLIN COMPANY

Manufacturers of GRINDING WHEELS — JACKSON, MICHIGAN, U. S. A.

Distributors in all principal cities

Sales Offices: — Chicago - New York - Detroit - Pittsburgh - Cleveland - Cincinnati - Milwaukee - Philadelphia

BEHIND THE SCENES

The Tools of War

■ If you haven't already seen the exhibit of military equipment in the Chrysler Building, don't fail to drop in for a few minutes on your next trip to New York. It's second only to a trip to Aberdeen Proving ground, which, of course, is a little more difficult to arrange.

We're sure you'll agree that just as our industrial equipment and production methods are superior to those of the Axis nations, so also is our military equipment. One ack-ack gun, for instance, is completely controlled by electric motors and controls, the power being supplied by a gasoline-driven generator. It may be aimed by remote control which draws an accurate bead on enemy aircraft.

There are a lot of other things to see, including blockbusters, various types of guns, a complete bomber fuselage and the like. Although the stuff we are using against the Japanazis is the last word, they haven't seen anything yet. A number of new things are in the works, some of which will even out-Bazooka the famous Bazooka which cuts through thick armor plate like cheese—as the Germans who *were* in Tunisia will well testify.

Machines That Have Morals

■ Of course in our own market analysis work on STEEL we have for several years used the I.B.M. punched card system for tabulating and maintaining our data. So, also, has many another private business in their production or payroll work. But, mister, if you really want to be flabbergasted sometime take a run out to Suitland, Maryland where, in a building that stretches from here to there, the census tabulations are made and the data kept. They've got machines that will do everything except brush your teeth and tuck you in bed. Their pride, which was designed by Dr. Hollerith when a bureau employe, and is made right there on the spot in their own machine shop, counts at the rate of 400 cards a minute up to sixty different totals and variations without sorting the cards and gives it all to you on a neatly printed sheet. And the damned thing actually does its own thinking. For instance, we watched it making a count of the women in the country, showing age, marital status, etc., etc., all at the same time. Well a card went through punched to show a girl of five as being married. Without so much as even mulling it over the machine refused to count the card and pushed it aside so the mere human being running the count could fix the poor girl's plight.

Correction

■ Those of you who read with interest the story in the May 3 issue on the wartime shifts in population, reported as coming from the Bureau of the Census, will be interested in this letter from Dr. Philip M. Hauser, assistant director of the bureau in Washington:

I should have made more clear the fact that I prepared this analysis as a population student at the invitation of the American Management Association rather than in my capacity as assistant director of the bureau. The classifications and predictions made have, therefore, no official status and the Bureau of the Census should not receive the brickbats that may be stimulated by the article.

This, of course, is not to say that the classifications and predictions are not accurate. Rather it is to clarify a point in view of the fact that many manufacturers have already used this information and will continue to use it to relocate their branch offices and to plan and revise their postwar distribution procedure.

Visit to the Census Bureau

■ Incidentally we had the pleasure last week of meeting Dr. Hauser and his very capable associates at the Bureau of the Census, as well as J. C. Capt, director of the bureau. Never have we had more pleasant and efficient cooperation from either any other government agency or any private business. As was outlined in STEEL's story in the May 17 issue it will well pay any manufacturer interested in postwar or current markets to get better acquainted with his bureau of the census. You will get an intelligent and cooperative reception.

Innocent Observer

■ Those interested in a little education in the art of scientific gambling should contact most anyone who attended the Triple Mill Supply meeting in Cincinnati earlier this month. Of course we just stuck our toes in to see how the water was and in a quick five minutes got rid of a dollar's worth of nickels in a one-armed bandit across the river at the famous Beverly Hills club in Kentucky; figuring the machine requiring silver dollars would be a little too rough. For those inclined toward the higher sciences, you can name it and get it with $1000 pay-offs on the bingo games.

Bouquets

■ Two nice bouquets in the mail this week:

I wish to go on record as saying that there is no better source of information to the metallurgist than STEEL. Also I wish to compliment you upon your publication of the handbook "Modern Small Arms" and would be very interested in any other such publications that may appear in the future.

—James P. Davis,
Ordnance Dept., Aberdeen, Md.

Your magazine fills a valuable part of every day business and you can rest assured I shall not be without it.

—Harold Jacobs
Clayton, Missouri

The Postwar Automobile

■ As with E. C. Kreutzberg's special report on Postwar Planning, there has been such a demand for reprints of A. H. Allen's series on the Postwar Automobile that we are reprinting it for further distribution. In limited quantities, copies are available to regular subscribers free of charge by writing to the Readers Service Department, Penton Building, Cleveland.

Vol. 112, No. 22, May 31, 1943, issue of STEEL, published every Monday at Cleveland, Ohio. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

Editorial Contents—Page 25

Even the "Experts" Were Stumped
IN A QUIZ ON BAR TURNERS

Do you run into oversized or undersized diameters?

Are you ever troubled with "barber-pole" or "Chinese-writing" finishes?

Ever have a "lump" at the start of a cut?

Ever cuss at the "sloppy fit" of reground cutters?

THE Warner & Swasey Single Cutter Bar Turner sees more service than any other tool used in turret lathe setups for bar work.

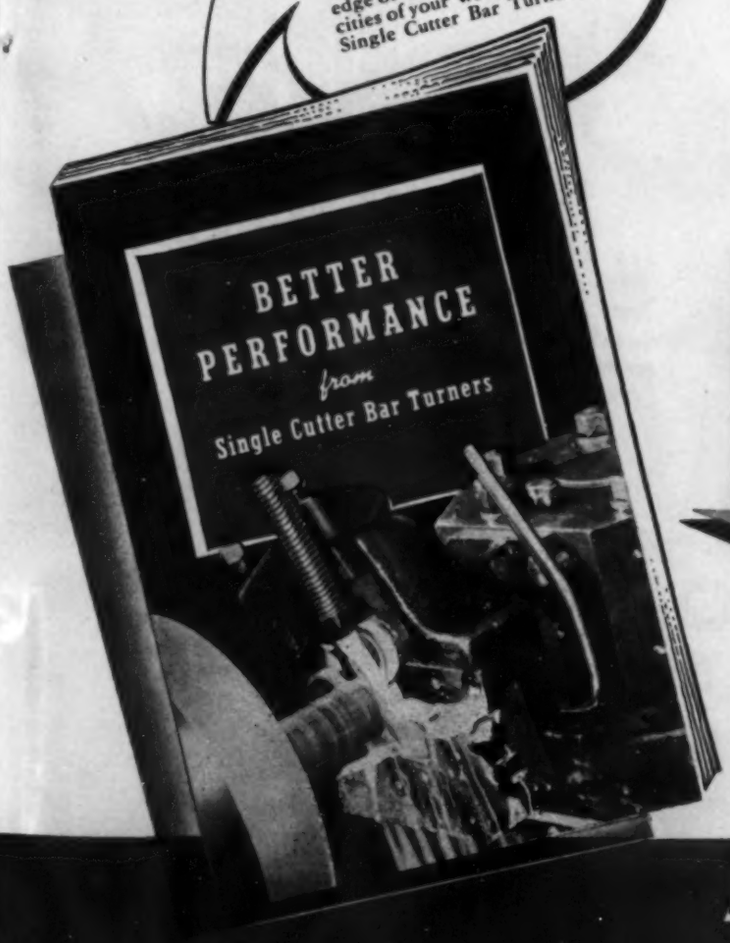
Job studies of this tool in action in plants all over the country disclosed to our field men the urgent need for a better knowledge of the mechanical details in the tool itself, and a better understanding of its usage.

Many operators were not getting the best performance from the tool because simple adjustments were overlooked, cutters were improperly ground or wrongly positioned.

This is no reflection upon these operators. Even the master machinist or veteran setup man can learn things about this important tool that he probably didn't know before.

That's why a 32-page booklet about the Single Cutter Bar Turner has been written and is offered by Warner & Swasey as a guide to better finishes and increased production.

This new 32-page booklet just off the press will help eliminate those troubles. It is packed with information, helpful hints, illustrations, and diagrams that will give you a better knowledge of the versatility and capacities of your Warner & Swasey Single Cutter Bar Turner.



Use the Handy Coupon — Mail Today —It Will Bring the Single Cutter Bar Turner Manual Promptly.

WARNER & SWASEY
Turret Lathes
Cleveland

Warner & Swasey Operator's Service Bureau, Cleveland, Ohio
Please send booklet, "Better Performance from Single Cutter Bar Turners".

Name _____

Address _____

City _____ State _____

I work at (Company) _____

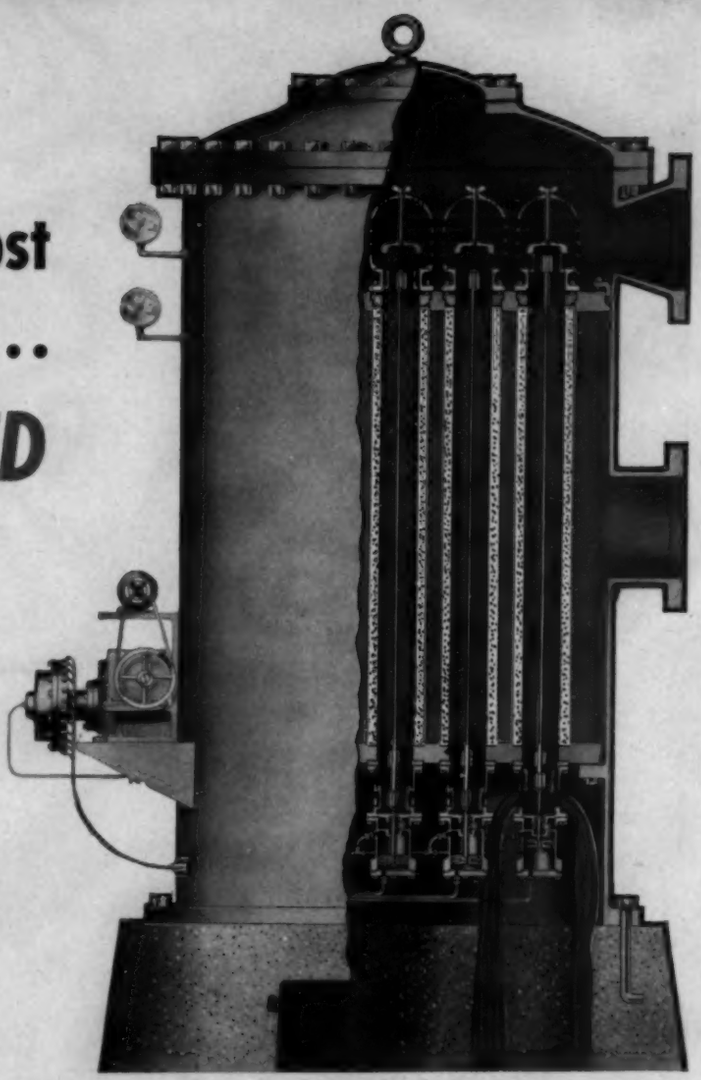
ST-14

YOU CAN TURN IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY

Automatic WATER FILTERS

High maintenance cost from dirty flood water...

CAN BE ELIMINATED



● Your bearings and rolls will last longer with FILTERED WATER and your hydraulic equipment will give more hours of trouble free service.

The success of ADAMS AUTOMATIC filters where others have failed is due to low velocity filtration. Where outdated equipment used 5 sq. ft. of filtered area, ADAMS AUTOMATICS use 100 sq. ft. For steel mill service, we recommend Adams monel PORO-SCREEN tubes capable of removing particles 4/1000" and larger. The multiple tube design has no moving clearances and is fully automatic. One tube backwashed at a time while filter is delivering full rated capacity. Adjustable control gives flexibility of backwashing—flood water more frequent—normal water less frequent. Built in four sizes from 300 gpm. to 2000 gpm. Write for Bulletin 901.

★ R. P. ADAMS COMPANY, INC. ★

75 CHICAGO STREET, BUFFALO, N. Y.

ADAMS PORO-STONE AND PORO SCREEN FILTERS

MORE { TONS PER LOAD . . . *EVERY LOAD!*
LOADS PER DAY . . . *EVERY DAY!*
DAYS PER WEEK . . . *EVERY WEEK!*

● That's Plymouth's Promise of Performance . . . a promise to those who have yet to use a Plymouth, a happy realization to Plymouth owners.

Low cost operation, minimum upkeep, rugged construction, ample power, speed, versatility . . . that's why you will find so many Plymouth Locomotives providing industrial transportation. Gasoline or diesel powered Plymouths are the correct solution to haulage problems. And . . .

TRACK HAULAGE IS CHEAPER HAULAGE

PLYMOUTH GASOLINE and DIESEL LOCOMOTIVES

PLYMOUTH LOCOMOTIVE WORKS

Division of The Fate-Root-Heath Co. PLYMOUTH, OHIO, U. S. A.

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CABLE ADDRESS
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AN OPEN LETTER TO OUR CUSTOMERS

We know that the procurement departments of industry have the very toughest problems during war time. At least, metal buying is much more difficult today than metal selling.

The aim of an efficient sales organization should be to advise and assist the buyer, and to expedite shipment of orders.

"ADVISE": We cannot call on you as often as we used to - some of our most experienced men are in full time Government service, others, part time - so we cannot sit down and discuss your problems as we could heretofore.

"ASSIST": A salesman's hardest duty is to refuse to accept 100% of a valued customer's order. Yet we often cannot book more than two-thirds or three-quarters of the tonnage offered.

"EXPEDITE": At present we cannot carry normal stocks of lead, zinc, antimony or cadmium; and direct Government orders, especially for Lend-Lease, must take precedence, so we are often unable to expedite your orders by shipping on the dates requested.

Circumstances may cause us to fall short in performance of our sales ideals, but we still have ideals.

Yours very truly,

Irwin H. Cornell

Vice Pres. and Sales Mgr.

IHC:b

It's the Mettle in your GUIDE *that Counts!*

TRANTINYL GUIDES
ARE PRECISION CAST
OF THAT *"METTLE"*

Youngstown Alloy Casting Corporation

YOUNGSTOWN, OHIO

Electromet Facts *for Steel Makers*

In addition to providing a full line of high-quality ferro-alloys and alloying metals, Electro Metallurgical Company can serve you in other important ways:

Experience—We have a background of over 35 years of experience in producing ferro-alloys, and our store of information on the use of alloys is available to the steel industry.

Development—We maintain modern laboratory facilities for developing new ferro-alloys and for solving industrial metallurgical problems. Developments from this research include the low-carbon ferro-alloys, silicomanganese, Silcaz and Silvaz alloys, calcium metal, calcium-silicon, calcium-manganese-silicon, and ferrocolumbium.

Service—A staff of technically trained metallurgists render on-the-job assistance to steel makers in the use of ferro-alloys. Because they have practical shop experience they are qualified to suggest the grades and sizes of alloys best suited for your particular use. They can also advise on possible substitutes for unavailable alloys, and on the best use of the alloys obtainable.

Literature—Booklets and reprints of technical articles give information of the correct use of ferro-alloys. Among these are "Vanadium in Steel and Iron.—A Review," "Boron," and "Electromet Products and Service." Write for any of these that can help you.

Facilities—Our plants have been greatly expanded to meet the current demands for ferro-alloys. Warehouses and sales offices are strategically located throughout the major steel-producing districts to insure prompt shipments on emergency and normal orders. Electromet Ferro-Alloys and Metals are distributed through offices of Electro Metallurgical Sales Corporation in Birmingham, Chicago, Cleveland, Detroit, New York, Pittsburgh, and San Francisco. In Canada they are sold through Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

"Electromet," "Silcaz," and "Silvaz" are trade-marks of Electro Metallurgical Company.

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
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In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Electromet
Trade Mark
Ferro-Alloys & Metals

Copper . . . or Stainless . . . or Nickel . . . Brass, Bronze or Silver . . . one side or both sides . . . any thickness desired.

SuVeneer*

*Trademark Reg. U. S. Pat. Off.

THE INSEPARABLY BONDED CLAD METAL

Roll it—spin it—draw it—stamp it! This uniquely-produced composite metal, an exclusive development of Superior Steel Corporation, opens new horizons to designers now occupied in product development for post-war sales.

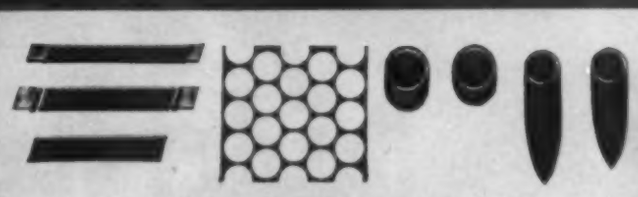
In SuVeneer Clad Metal, other ferrous or non-ferrous alloys are joined with plain steel, covering one or both sides in equal or different thicknesses. The ratio of clad to base metals remains constant through reducing and forming operations, providing high flexibility in product design and manufacture.

Mark "SuVeneer" well for the future . . . get the facts today!

"SuVeneer" in War

Steel, clad with gilding metal by the Superior process, forms the jackets of x-millions of United Nations' bullets each year—replacing the solid gilding metal jackets formerly used, and saving thousands of tons of copper monthly for other war needs.

Use of this Superior process for such war purposes has been granted without charge to a score of other steel companies, through the Duration.



. . . from the SuVeneer gilding metal clad strip, to cups, to finished bullet jackets.

"SuVeneer" in Peace

Reserved for tomorrow's designers

Superior Steel
CORPORATION
CARNEGIE · PENNSYLVANIA

WHAT WSR (WELDING SERVICE RANGE)

Tells You About Welding Heat...

When you buy a welding machine, you pay for just one thing: *heat at the end of the electrode.* A sure way of getting the heat you want at the lowest possible cost is to buy on the WSR basis (Welding Service Range) rather than on a theoretical rating.

WSR enables you to determine exactly how much *usable* welding current your machine will deliver. It enables you to put welding heat on the basis of cost per ampere.

P&H gives you this and such additional advantages as *single control,* instantaneous arc response, lower maintenance costs. Get the whole story on welder-wise buying. See your nearest P&H representative or write for the folder on WSR ratings.

P&H builds a complete line of A.C. and D.C. Arc Welders, as well as a full line of welding electrodes.

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CORPORATION
ARC WELDERS · EXCAVATORS · ELECTRIC CRANES · MOTORS · HOISTS · WELDING ELECTRODES

New products arising out of the stress of war will shape the pattern of your postwar production. Long-range planning to meet changing conditions, keen competition, new discoveries will bring rich rewards.

Our knowledge of casting non-ferrous metals, accumulated during almost 70 years, is a vast source of helpful information. Consult with our experienced engineers and metallurgists for new ways and short-cuts to unexpected profits.

N·B·M

NON-FERROUS CASTINGS

BRONZE BEARINGS AND BARS

NATIONAL BEARING METALS CORPORATION

ST. LOUIS · NEW YORK

PLANTS IN: ST. LOUIS, MO. · PITTSBURGH, PA. · MEADVILLE, PA. · JERSEY CITY, N. J. · PORTSMOUTH, VA. · ST. PAUL, MINN. · CHICAGO, ILL.

G-E IS MOBILIZED

AIRCRAFT DESIGNERS save weight, space, and assembly time with G-E "power packages," which combine as many as six devices (motor, gears, brake, clutch, load release, and limit switch) in one compact, combat-proved unit. Used to operate landing gears, bomb doors, wing flaps.

SURE-FIRE MOTOR PERFORMANCE is a "must" on machine-gun coolant pumps and loading mechanisms. In this special service, standard G-E fractional hp motors are providing compact power, proving their unusual ability to withstand severe shock and vibration.

DEADLINESS of our land, sea, and air weapons has been increased—by application of the G-E amplidyne. Along the industrial front, too, this versatile new generator-type amplifier is speeding production, conserving man power and materials.

Builder of TRI CLAD Motors ★ AMPLIDYNES AIRCRAFT POWER PACKAGES DYNAMOTORS GENERATORS EVERYTHING IN MOTORS

WE INVITE BUILDERS of motor-operated combat equipment to get in touch with us in the earliest stages of planning for their motor requirements. We are building so many new and ingenious fighting motors, it's 10 to 1 that we already have something which can be adapted to meet your needs.

Although we cannot accept any new orders for certain types of fighting motors, we do have, or will have in the very near future, facilities to engineer and build additional fighting motors of other types. We would appreciate the opportunity of reviewing your needs during the earliest stages of your planning, in order to determine how we can help you.

We have the pledge of the more than 1700 design and application engineers in our motor plants to give the fastest service it is humanly possible to give whenever they are asked to help on fighting motors. And even if we must say "No," we believe you will appreciate a fast answer. Get in touch with your local G-E representative to see if the fighting-motor design you need can be adapted to our available production facilities. *General Electric Company, Schenectady, N. Y.*

TO MOTORIZE IT

FRONT-LINE POWER for plane bases, emergency hospitals, and communication units. It is being supplied in quantity by these flighting generators which embody many of the features for which Tri-Clad motors are famous.

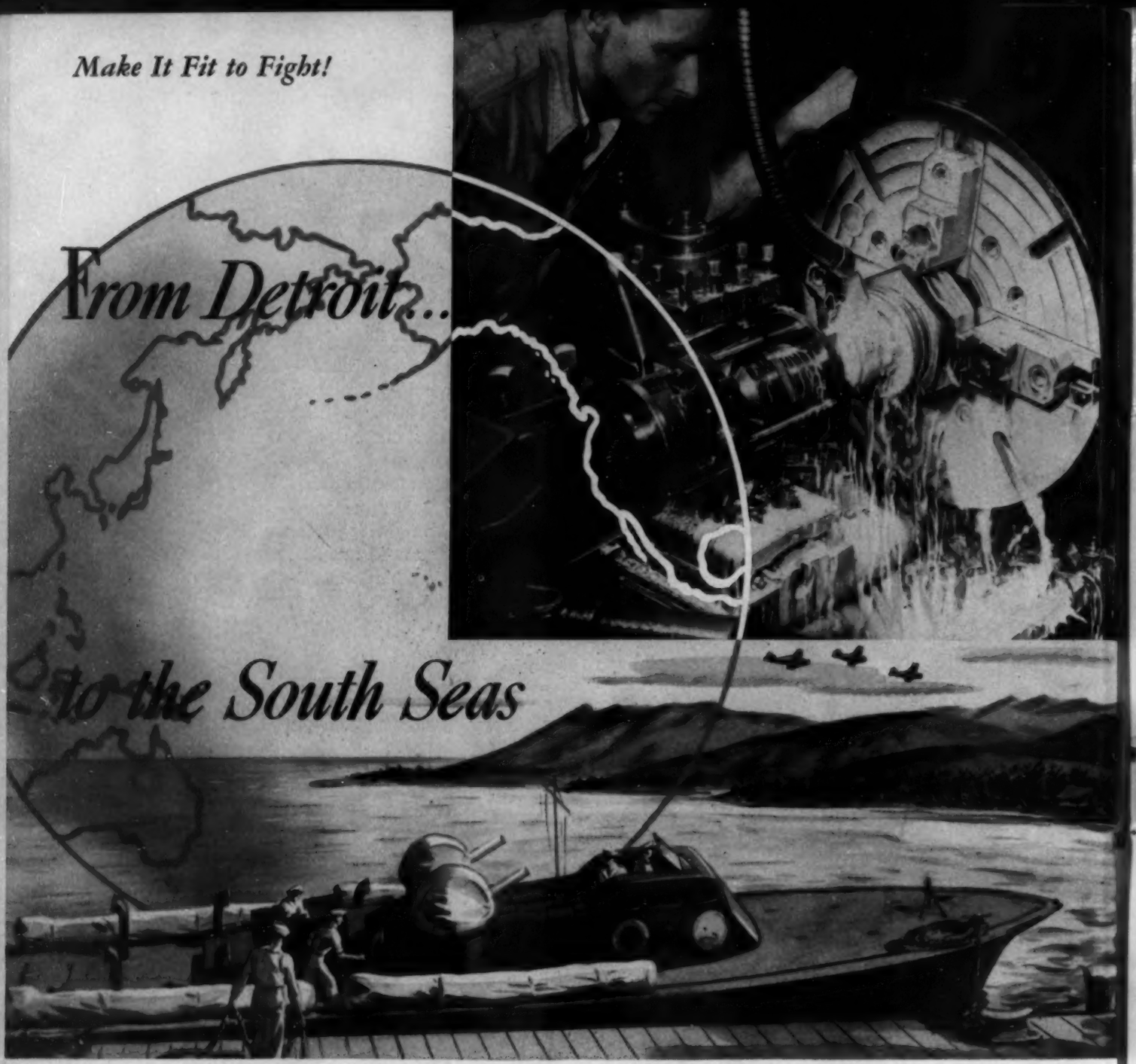
FOR NAVAL APPLICATION—In a space of five weeks, production of a brand new series of motors was raised 400 motors per week. Scheduled delivery to eight different customers was smoothly established.

FOR USE ON TANKS—To power radio equipment in tanks, a special dynamotor with increased capacity was developed. Sample in eight weeks; production in large quantities eight weeks after approval.

GENERAL ELECTRIC

750-201-8030

Make It Fit to Fight!



to fit within .001"

Extreme accuracy is the secret of interchangeable manufacture. Not only in the more rapid mass production of war's implements, but also in supplying replacement parts—for PT boats in the South Pacific—tanks in North Africa—or fighter planes in England.

To put such accurately machined parts *where* they are needed, *when* they are needed, is a job which calls for Gisholt's rigid construction to maintain precision at high cutting speeds.

GISHOLT MACHINE COMPANY
1211 East Washington Avenue • Madison, Wisconsin

LOOK AHEAD—KEEP AHEAD—WITH GISHOLT IMPROVEMENTS IN METAL TURNING

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES

At Gisholt, the Army-Navy "E" and the Treasury flag fly side by side.

"IT'S THE MOST RELIABLE METAL TUBING WE KNOW OF"

They all agree that it is . . .

And when production-conscious executives must have *absolute, 100% tightness* plus long life in flexible metal tubing, they usually specify American *Seamless* Flexible Metal Tubing. For past experience has shown them that this deluxe product will flex millions of times without failure.

American *Seamless* is all-metal, made from *seamless tubes.* It has neither joints, welds, laps, seams nor packing at which leaks might develop. It combines the flexibility of rubber hose, the dependability of metal, the strength of rigid pipe.

Another interesting feature—you can get American *Seamless* Tubing in practically any workable metal of your choice.

Throughout industry, American *Seamless* is almost a password. Countless war plants are using it to convey air, fuel, water, chemicals, cutting compounds, refrigerants, propane and butane, manufactured freon, ammonia, oxygen, hydrogen, nitrogen, acetylene and many other fluids. They use it too for controlling vibration and for connecting moving or misaligned parts.

Whatever your requirements you'll most likely find that we have a flexible metal tubing or hose that will help you do the job just a little bit better.

Why not investigate?

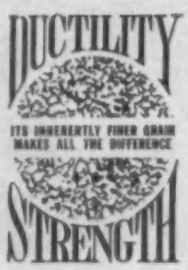
American Seamless—corrugated from seamless rigid tubing . . . pressure tight as the metal tube from which it is made.

ANACONDA

American Metal Hose

AMERICAN METAL HOSE BRANCH OF THE AMERICAN BRASS COMPANY • General Offices: Waterbury, Conn.
Subsidiary of Anaconda Copper Mining Company • *In Canada:* ANACONDA AMERICAN BRASS LTD., *New Toronto, Ontario*

Conserve 2 ways with N-A-X HIGH TENSILE



1. CONSERVE STEEL

The use of N-A-X HIGH TENSILE helps to conserve precious steel—because you can build *lighter* with this low alloy steel without any sacrifice of strength. The high tensile strength of this superior steel makes possible the use of lighter sections—and this effects a saving in over-all weight.

2. CONSERVE TRANSPORTATION

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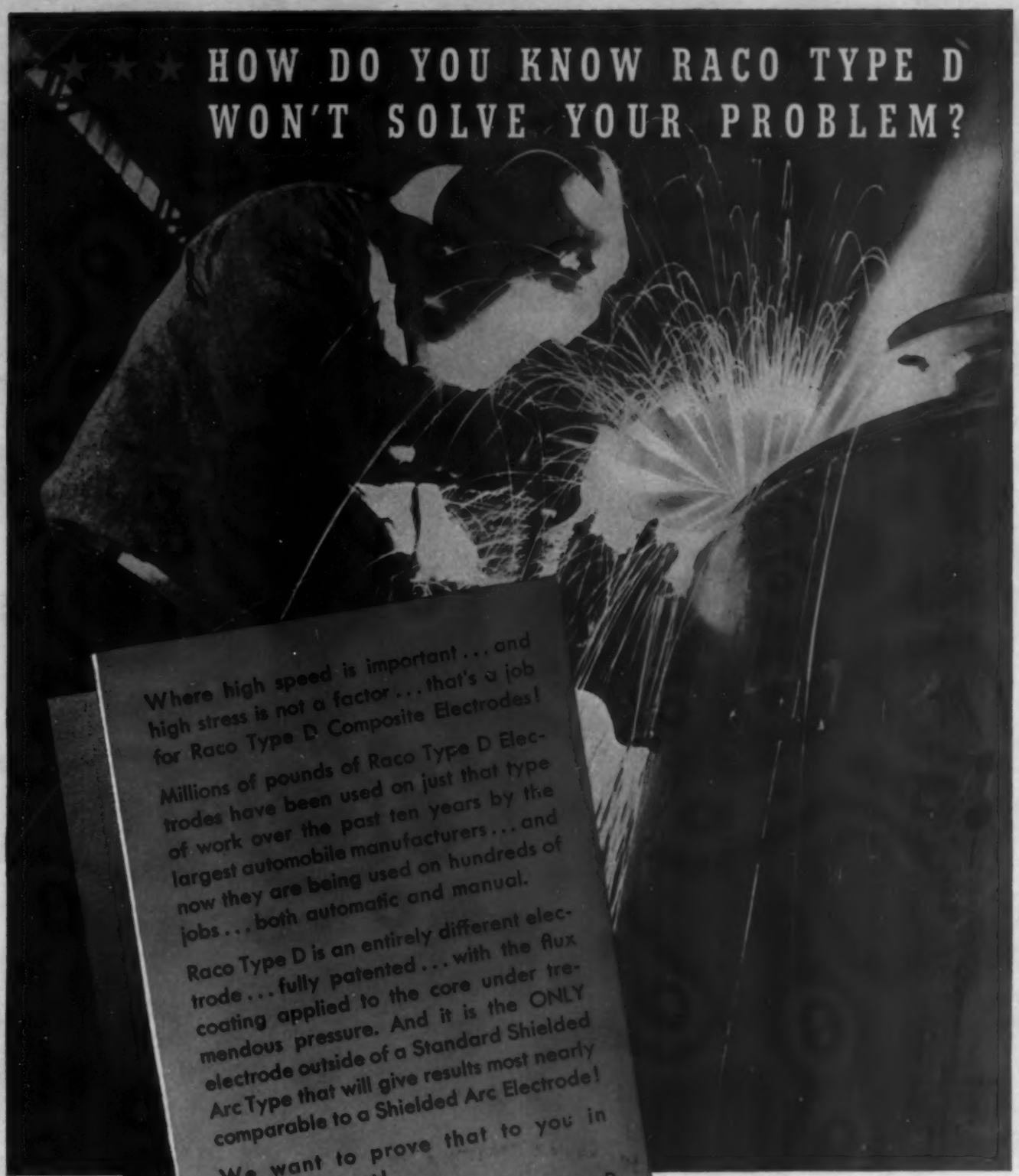
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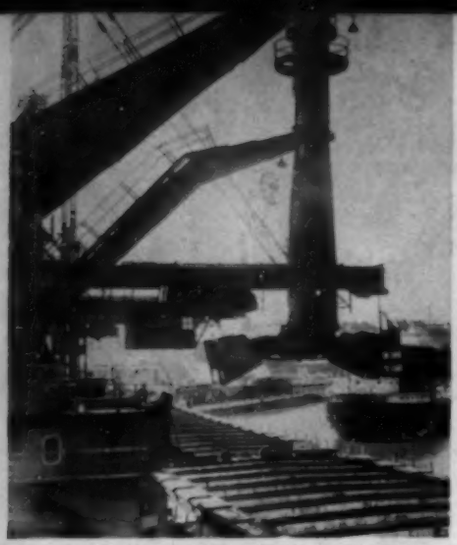

Huge unloaders facilitate handling of iron ore at many points on the Great Lakes. Page 42

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STEEL

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MAY 31, 1943

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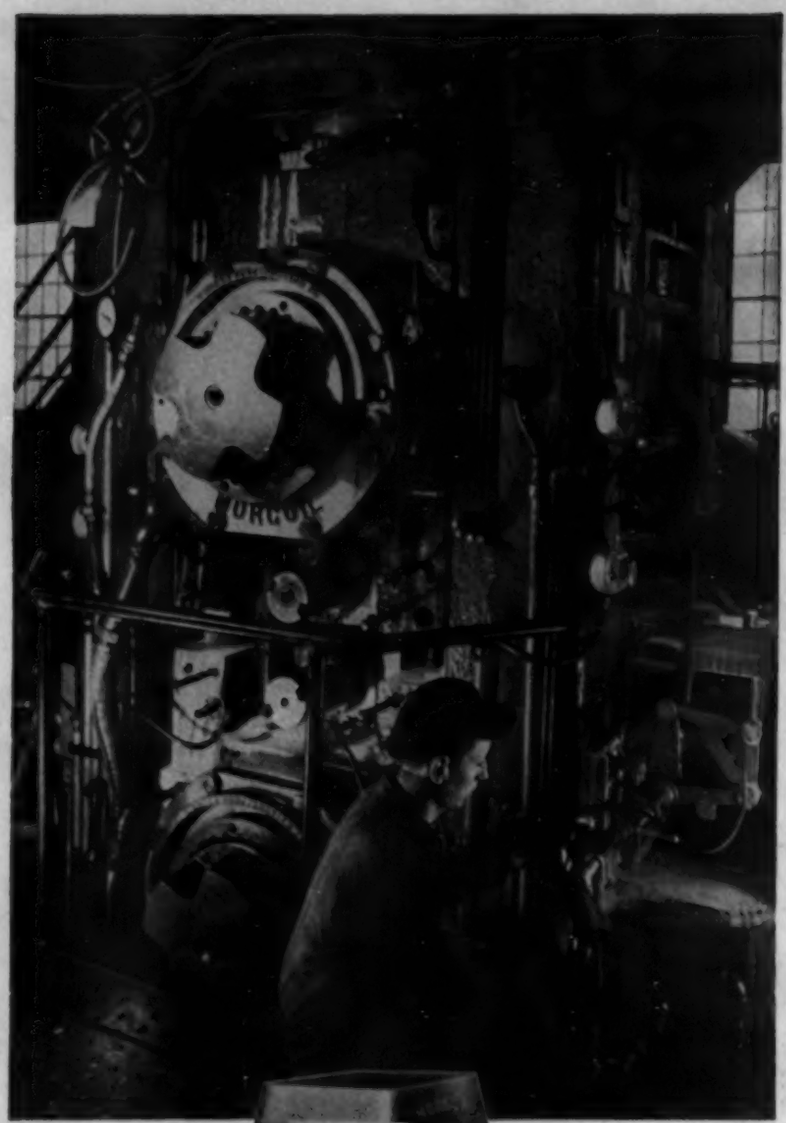

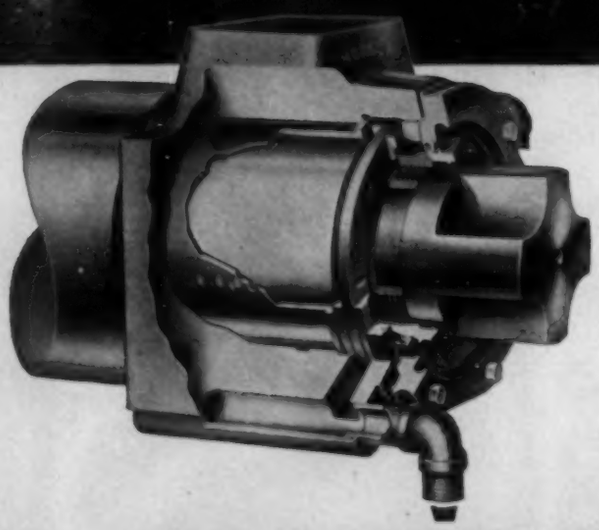

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STEEL
May 31, 1943

THEY TRUST INDUSTRY: As one sat in the large ballroom of the Waldorf last Thursday listening to the addresses of President Walter S. Tower, Admiral S. M. Robinson and General L. H. Campbell Jr., to the thousand or more members of the American Iron and Steel Institute attending the fifty-second general meeting of that organization, one could not help but be impressed by the high degree of co-operation existing between American industry and the responsible procurement officers of the two major military services.

The remarks of Admiral Robinson and General Campbell showed clearly that both thoroughly understand industry, that they are conscious of the wonderful things industry has done thus far in this emergency and that they appreciate how important industry's contributions are to the winning of the war.

We venture the opinion that every man in the audience was thinking how wonderful it would be if all of industry's dealings in the war effort could be handled through men of understanding—through men who trust industry as Admiral Robinson and General Campbell do.

• • •

INSPIRE CONFIDENCE: Admiral Robinson paid a high tribute to the steel industry. He was particularly appreciative of the miracle steelmakers performed in stepping up steel plate production quickly to meet the sudden and sharply increased demands for Navy and merchant shipbuilding. He was equally appreciative of the work metallurgists have done in this war. Incidentally, he gave some figures on the tonnage of ingots (pp. 31, 32) required for warships and cruisers, which probably were new and enlightening to many in his audience.

General Campbell, whether by intent or otherwise, accomplished three great missions in his address. He "sold" his Ordnance Department so convincingly that every steel man who heard him has unbounded confidence in its ability to do its job superbly. He scotched the idea prevailing in some quarters that big business has received a lion's share of war contracts. He did this by showing (p. 32) a breakdown of orders handled in the Philadelphia Ordnance district. Thirdly, he testified time and time again as to the extent to which the Ordnance Department relies upon industry.

These words of appreciation from high authorities in the two services came to industrialists as a welcome relief from the petty criticism and politically-inspired bickering which marks so many of industry's relations with Washington officialdom. Admiral Robinson and General Campbell inspire confidence.

• • •

A PARTIAL VICTORY: Considering the difficulties confronting them, the members of the Senate-House Conference Committee have done a good job in drafting a compromise tax bill. At this writing, it looks as if both houses will pass it without too much further delay.

As is always the case when the opponents on an issue yield ground to effect a compromise, the result will not please either side. The President may derive some measure of enjoyment from the fact that he forced Congress to give up its idea of treating every taxpayer alike. In fact, his insistence that the taxpayer in the lowest income brackets be given preferred treatment may be politically advantageous to him temporarily.

In the long run, it may prove to be anything but advantageous. If the recipients of the President's favor reward his generosity in the way other groups have rewarded similar favors handed out by the Roosevelt administration, the result will be bad.

Most persons, while resenting the administration's petty politics in this tax mess, will be grateful for a tax bill which puts the pay-as-you-go principle into effect. In a broad sense, the people have won a partial victory over administration obstinacy and pettiness. Congress, while yielding to the Presi-

(OVER)

dent's coercion in regard to discrimination, nevertheless has managed to retain more of the original features of the Ruml plan than the President or the Treasury Department desired.

In time, the public may forget the details of the administration's fight against the Ruml plan, but history will record the administration's position on tax matters during the present emergency as one of its chief wartime weaknesses.

• • •

PUTTING FACTS TO WORK: It is curious how a useful bit of knowledge can repose in idleness for decades before somebody discovers how to put it to work.

In 1914 a German technical periodical described a series of tests of the action of explosives on a steel plate. If a plain, cylindrical cartridge resting on a steel plate were detonated (p. 66) the downward force of the explosion would penetrate the plate say half an inch. But if a cone-shaped section of the powder in the lower end of the cartridge were removed and the remaining powder detonated, the downward force of the explosion would penetrate the plate much more than half an inch, even though less powder was used.

Whether or not this knowledge, revealed at about the time of the beginning of World War I, proves to have important applications in World War II, remains to be seen. In any event, the startling performance of the hollowed-out cartridge will bear investigation for peacetime applications after the war has been won.

• • •

WHY WE ARE STRONG: In recent months, most authoritative reports from Washington have indicated that production for war, while not evenly balanced in every respect, is progressing so satisfactorily that there is little doubt that a sufficient volume of war goods will be turned out to enable the allied nations to win the war.

These reports, taken in conjunction with other evidences, are convincing the American public that industry has done a pretty good job, notwithstanding the frequent criticism which has been directed toward its efforts by politicians and others. In short, the man in the street is convinced that industry has done and is doing its job well. However, he doesn't know the whole story. He doesn't know exactly why industry is doing its job well. He may even think industry is doing it because the government "forced" it to do it. Or, he may think that the present complex organization at Washington deserves credit for the job.

The cold fact is that industry has been able to do a good job because it got a good start using the ingenuity, resourcefulness, ability and know-how which it acquired or developed under the system of individual enterprise. None of these assets came out of the regimentation now being practiced. All came from the period when each company was encouraged to be independent and self-reliant.

This truth should be emphasized. We are strong because we learned to be strong before this war started.

• • •

TOO MANY GO AT 50: The untimely passing of Edsel Ford at the age of 49 (p. 53) brings to national attention a problem which deserves much more consideration than it has received.

Mr. Ford was a relatively young man. His position in life was such that he could command the very best medical skill obtainable. His ailment apparently was one that is fairly common among men at his age, or older. Thousands of men, similarly afflicted have sought treatment, heeded medical advice and lived long, useful lives. But Mr. Ford didn't want to lose time from his job. His devotion to duty caused him to neglect his health. He drove himself when he should have been resting. In his zeal to keep going, he did what thousands of other middle-aged industrialists have done—he jeopardized his life.

Edsel Ford's death is a great loss to industry, but that loss can be lessened in part if the lesson of his misfortune will be heeded by others who are driving themselves too hard. America is losing far too many of its ablest business men between the ages of 45 and 55.

E. L. Shaner

EDITOR-IN-CHIEF

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• Many skills and complete modern equipment for testing, cutting, forming, handling, shipping — all combine in Ryerson *Steelmanship*. All are devoted to the single purpose of this vast highly specialized steel warehouse system. All contribute to the job of getting the steel you want — in the quality, form, size and place — exactly when you want it. • True, there are our war problems of shortage here and there, but most generally Ryerson Steel-Servicemen can take care of you. • Whether it is a question of selection, fabrication or just quick delivery—*call Ryerson first.* Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Philadelphia, Boston, Jersey City.

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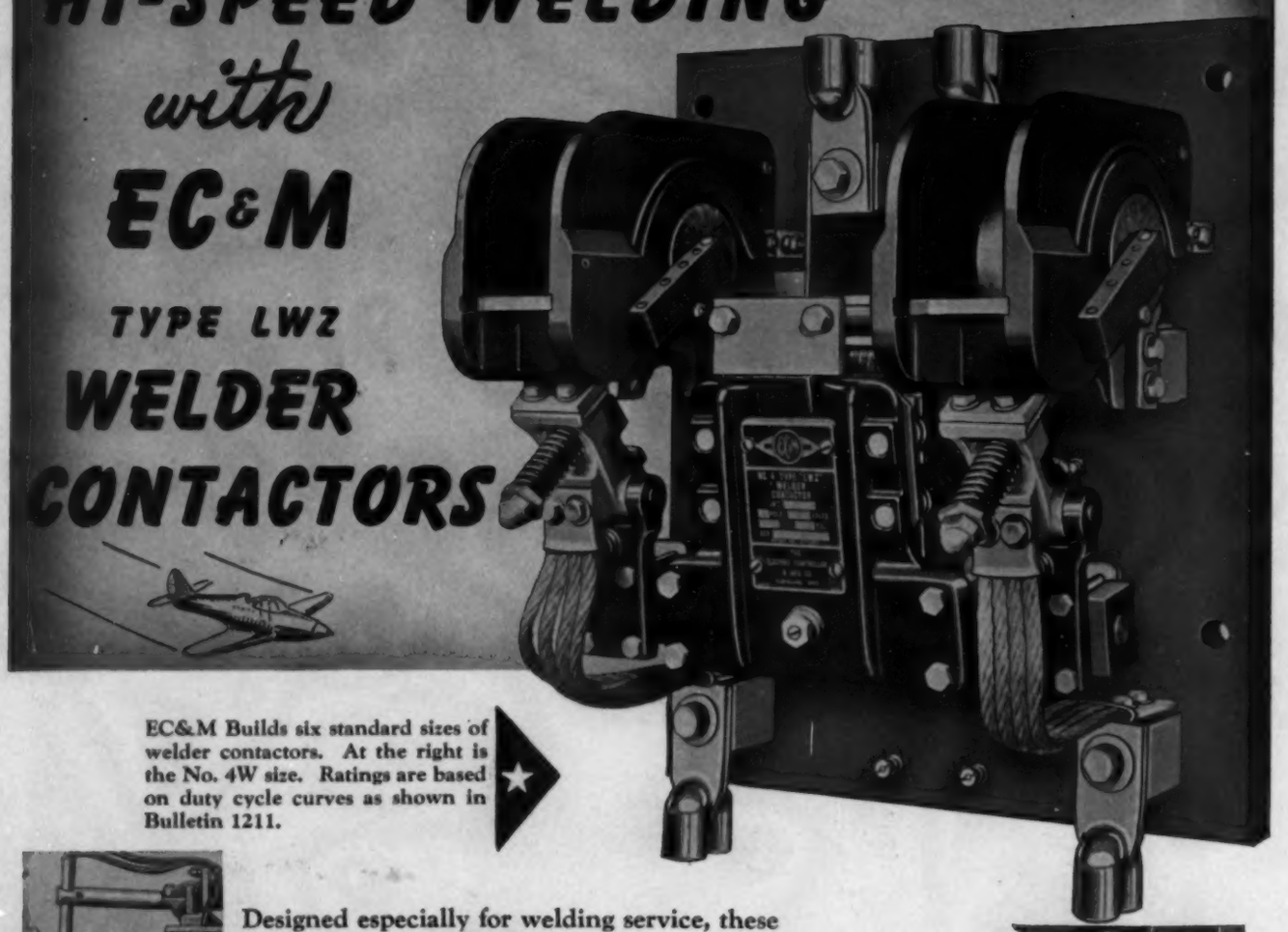

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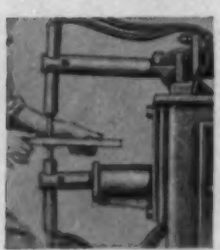

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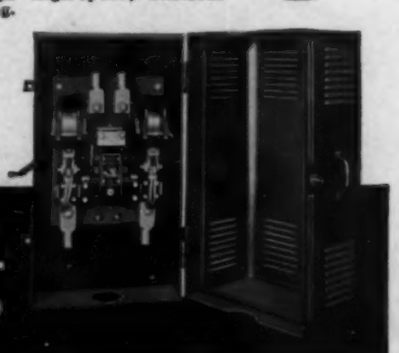
High in arc-handling ability, low in upkeep, these EC&M Type LWZ Contactors have no equal. Ask for illustrated Bulletin 1211.

Convenient contact-adjustment makes possible consistent results through high-speed, uniform opening.



THE ELECTRIC CONTROLLER & MFG. CO.

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Industry's Ability To Meet All Demands Of War and Essential Needs Demonstrated

Delegates to fifty-second general meeting of American Iron and Steel Institute hear President Tower trace trade's outstanding accomplishments of past year

CONFIDENCE that the iron and steel industry can meet all war demands and other essential emergency needs was expressed by Walter S. Tower, president of the American Iron and Steel Institute, speaking before the opening session of the fifty-second general meeting of the institute at the Hotel Waldorf-Astoria, New York, May 27.

More than 1000 members were in attendance at the start of the opening session at which Maj. Gen. L. H. Campbell Jr., chief of ordnance, War Department, and Vice Admiral S. M. Robinson, Office of Procurement and Materials, Navy Department, also spoke.

Scrutinize Industrial Relations

Industrial relations came in for close scrutiny and a series of three separate round table discussions of timely operating and metallurgical problems comprised the general technical session with the general theme, "The Steel Industry's Contribution to the War Effort."

C. E. Davis, vice president, the Alan Wood Steel Co., presided at one of these sessions, A. P. Miller, general assistant superintendent, Inland Steel Co., at a second and J. G. Morrow, metallurgical engineer, the Steel Co. of Canada Ltd., Hamilton, Ont., at the third.

At the industrial relations session, E. F. Blank, director of personnel relations, Jones & Laughlin Corp., presiding, J. H. Stephens, vice president, United States Steel Corp. of Delaware, spoke on "The Evolution of Industrial Relations between Two Wars," and C. H. Huston Jr., assistant to the president, Lukens Steel Co., on "Design for Future Industrial Relations in the Steel Industry."

Mr. Tower said the steel industry has its main job of organizing for the war effort well in hand.

By the end of this year the steel expansion program should be largely a closed chapter, he said. He believed necessary supply of metallics can be provided, if completion of new blast furnace capacity is not unduly delayed, and said the answers to the chief questions with respect to alloys are now in sight. The task of steel producers now begins to settle down, he declared, to one of holding about the present level until the demand for steel for direct war uses starts to decline.

The industry now is producing at the rate of 90 million tons for 1943 and has some chance of exceeding this figure by one or two million tons but, he added, "you can't even reach the lower figure unless a courageous national policy puts war above politics and prevents war labor stoppages in your mines and mills like those occuring in other industries."

Production on Gigantic Scale

It is inevitable that production on any such gigantic scale as in recent months must have absorbed millions of tons of steel, he said, in the space between the rolling mill and the point of emergence from the complete manufactured articles like ships, tanks, guns, planes and projectiles. Some shrewd guesses, he said, have set that figure all the way up to 18,000,000 or 20,000,000 tons by the end of last year.

Whatever the size of those inventories, when war needs stop, efforts to work them off at the expense of new production will be influenced by the degree of fabrication and the nature of the products. Ship plates, armor, shell rounds, forging steel and the like may suffer. Consumers will want sheets, strip, wire, pipe and other products, supply of which has been restricted for even essential civilian needs. While sizable stocks of some products to be liquidated might have a depressing effect on certain divisions of the industry, that influence, Mr. Tower declared, need not react to the disadvantage of other divisions, if sound policies are followed.

WALTER S. TOWER

He pointed out that completion of the steel expansion program will account for about 95,000,000 tons of ingot capacity, or almost 15,000,000 tons increase since 1940.

As for postwar reconstruction, he said there could be no question about the capital values, probably in the billions of dollars, which will need to be recreated once this war is over. But in that connection, he warned, one must keep in mind certain modifying factors. The job of recreating these values probably will take years. There may be serious questions whether some of them should be or will be allowed to revive.

Metallurgical progress by the United

MAJ. GEN. CAMPBELL JR.

VICE ADMIRAL ROBINSON

States in two years has exceeded German accomplishments of the past decade and advanced beyond Japanese developments of the last thirty years, Maj. Gen. Levin H. Campbell, Jr., chief of Army Ordnance, said.

Application of these "great metallurgical gains" is reflected in the "superquality" American armament furnished the "world's best fighting man, the American soldier," he declared.

Declaring that there are men living today who were present when the keel was laid for the first steel ship built in the United States, USS DOLPHIN, Vice Admiral S. M. Robinson, U.S.N., traced briefly the development of the use of steel in shipbuilding and emphasized steel's present great importance to the naval program. Steel, he said, has caused a greater revolution in naval warfare than "the most radical prophet could have anticipated."

Stresses Need for Quality Steel

He stressed the need of the Navy for high quality steel. For combatant ships the Navy must have steel that will withstand every known stress and shock and must have it in quantity, he said. A 45,000-ton battleship requires 42,000 tons of alloy and carbon steel for the hull and machinery alone. This includes ordered steel weights plus ingot weights for the heavy forgings. To this must be added an equal weight of ingots for ordnance. A 45,000-ton battleship takes in the neighborhood of 42,000 tons of ingot for her armor plate, guns, etc.

Admiral Robinson said it is not too far out of the way to say that a 45,000-ton battleship requires more than 100,000 tons of ingots.

A 10,000 ton cruiser will use 10,500 tons of steel in ordered weights for hull and machinery and another 5400 tons of ingots for ordnance equipment.

All directors of the Institute were re-elected.

Industrial Relations Entering New Era Dictated by Conditions

INDUSTRIAL relations in steel as in other industries in the future will be largely influenced by prevailing political and economic environment, C. L. Huston Jr., assistant to the president, Lukens Steel Co., Coatesville, Pa., told members of the American Iron and Steel Institute, speaking at the session on industrial relations at the Institute's fifty-second general meeting at the Waldorf-Astoria, New York, May 27.

Mr. Huston was one of several prominent steel industry authorities who presented papers and spoke at the session. Another paper was presented by J. A. Stephens, vice president, United States Steel Corp. of Delaware, whose topic was, "Evolution of Industrial Relations Between Two Wars".

R. C. Cooper, Wheeling Steel Corp., was on the program to present a paper "The Steel Industry and National Manpower", but was unable to be present.

To view what type of relations we are going to have and what type of policies should be adopted to meet those relations we must first attempt to predict our probable environment, said Mr. Huston.

"How much further will be the swing towards organized labor's limitations of those prerogatives traditionally regarded as belonging to management?" he asked.

"Already a reaction against the activities of a few extremists in organized labor is under way. Unmistakable indications of this change can be noted in Congress and the legislatures.

"On the other hand, is there anything in the picture as yet to indicate we face the type of reaction that followed the last World War? I do not believe so.

"In the first place there are now 11,000,000 or 12,000,000 members of unions as compared to a little over 4,000,000 in 1920. The tripling of union membership as compared with 1920 naturally gives the unions greater strength to maintain their power and prestige. Secondly, the closed and union shop contracts now cover about 6,000,000 of the union members, while the maintenance of membership contracts cover about 2,000,000 more—including almost 100 per cent of the steel industry's workers. These contracts should enable the unions to build up large financial reserves to tide them through the period when the pendulum is swinging in the other direction, and to combat that swing. Finally, I would note that the Wagner act guarantees the unions great economic and political freedom to maintain and further develop their organization.

Discusses Employes' Welfare

"That employment must be maintained is recognized by all those leaders of business associated with the Committee for Economic Development.

"I believe we are entering a new era of industrial relations. Around the time of the last World War and afterward, industrial relations emphasized such developments as employe safety, health, recreation and other welfare plans. Later in the 1930's came a new period when collective bargaining became the predominant phase of industrial relations and overshadowed welfare activities.

"The new era we are entering will be different. The determination of industrial relations policies and their administration will undoubtedly be influenced by two viewpoints. On the one hand, the company is interested in preserving and enhancing its economic position, while at the same time, the union is

J. A. STEPHENS

E. F. BLANK

C. L. HUSTON JR.

anxious to insure its own security.

"The company will increasingly adjust its industrial relations policies and their administration, according to the answers to questions such as the following: 'Do they satisfy a fundamental desire of the men?' 'Do they help to increase productivity?' 'Do they make the workers say—This is a good place to work?'

"Similarly, the union becoming more mature, will undoubtedly not oppose policies merely because they are favored by or favorable to the company but instead will actually support measures that strengthen the company if such measures do not conflict with the union's security.

"I suggest that as time goes by we are going to regard the grievance procedure as an opportunity to get better acquainted with the desires of our men and those of the Union. Since the relationship between the union and the steel industry has now passed the organization stage, we should expect settlement of petty grievances in the early stages of the grievance procedure and that the joint sessions of union and management representatives will spend more time on policies and plans for improved over-all industrial relationships.

More Stabilized Employment

"With the application of contractual promotion, lay-off, seniority, and discharge provisions throughout the industry and the adoption of experience rating in unemployment insurance laws in an increased number of states, there is a clear trend in the direction of more stabilized employment and reduction of turnover.

"A commendable industry-wide step in this direction is currently being taken through the work of the American Iron and Steel Institute's Subcommittee on Job Description and Classification which is preparing a 'Dictionary of Job Titles in the Steel Industry.'

"We have for some time realized that it was not enough merely to attempt to carry out sound industrial relations policies. We knew that employes must be informed as to the existence of those policies and the reasons for them. More recently we have found it desirable, in addition, to transmit this information to employes' families and the communities in which they live.

"Thus we attempt to project the design for the future of industrial relations in the steel industry based on present day trends. The fundamental policies that have proved sound through past years will continue to guide us in the future. It is in their application to problems of the future that management's judgment and vision will be challenged."

Wartime Production Problems

Analyzed at technical session in twelve papers prepared by leading industry officials who emphasize urgency of critical material conservation and peak production

TWELVE PAPERS were presented at the technical session of the general meeting of the American Iron and Steel Institute, held in New York last Thursday. The program of the technical session was heavier than a year ago and great interest was shown in the papers presented.

C. L. McGranahan, assistant general superintendent, Jones & Laughlin Steel Corp., Pittsburgh works, Pittsburgh, presenting a paper on "Production of Steel Plates", cited the phenomenal increase in steel plate production during 1942 as one of the outstanding achievements of the steel industry. Production of 6,200,000 tons in 1941 assumes mediocre proportions compared with the 12,000,000 tons turned out in 1942.

Continuous strip mills share of the 1,012,194 tons produced in May, 1942, was 425,211 tons or 2.8 times the October, 1941, figure. Their 1942 peak was reached August, 1942, when 551,959 tons were made, representing 50.3 per cent of total production and 3.6 times the October, 1941 figure. Total output for 1942 was 11,719,938 tons, continuous strip mills contributing 5,194,022 tons or 44.3 per cent.

A. P. Miller, assistant general superintendent, Inland Steel Co., Chicago, in a paper on "Increase in Open-Hearth Production and How Achieved", mentioned that in pouring alloy steel practically all ingots are poured into hot top molds. Recent innovation in the use of the open hearth has been its utilization to premelt and pre-refine scrap for electric furnaces. Factors affecting total open-hearth production are additional furnaces and enlargement of existing facilities, percentage of total available time which they were operated, and actual output while the furnaces were in operation.

In certain open-hearth plants the size of heat tapped is governed by the capacity of the ladle available. To order heat weights according to ladle capacity it is necessary that operations on the pit and the charging floor be closely co-

EMPHASIZES WORKERS' "PRESENTEEISM"

WORKERS' presenteeism—not absenteeism—is being pointed to with pride by Charles F. Bannan, secretary, Western Gear Works, Seattle, Wash., as Capt. L. J. Stecher, U. S. Navy, looks on with approval. April attendance was 95.6 per cent and 96.4 per cent for the first 20 days of May. Chart shows how various shifts' records compare with one another. W. M. Ewing, personnel manager of the firm, is shown at right

ordinated. One of the most important features in minimizing the time required for repairs during the drive for increased production has been the more widespread use of basic refractories throughout the furnace construction. Bottom construction has been revolutionized during the past few years through the advent of cold ramming refractory hearth material. In many plants systems have been developed whereby slag may be removed from slag pockets in several large lumps. Current trends in checker chamber design have tended toward greatly increased heating surface. Complete sealing and insulating of open hearths below the charging floor level has contributed materially toward improved combustion practice. Wide-spread adaptation of magnetic methods for carbon analysis has contributed a material reduction in the working time for a heat of steel.

S. J. Creswell, superintendent open hearth No. 3 and bessemer department, South Chicago works, Carnegie-Illinois Steel Corp. in presenting his paper, "The Increased Importance of the Bessemer Process", cited the acceptable record of bessemer steel in regard to weldability. Spot welding of this grade of steel offers no difficulty. Electric arc welding results have been uniformly satisfactory. Machinability of bessemer steel has thus far proved to be unequaled by other grades. Bessemer steels with 0.20 per cent or more of copper under exposure tests has corrosion properties at least as good, if not better than those of copper-bearing open-hearth steel.

Saves Alloying Elements

John Mitchell, metallurgical engineer, alloys, Carnegie-Illinois Steel Corp., Pittsburgh, speaking on "Trends in Alloy Steels", cited conservation measures of alloying elements used in alloy steels. He emphasized that wherever possible NE steels are being used in such applications as in tank and combat vehicles. There has been sufficient production experience with the use of NE steels to indicate rather definitely that such phases of fabrication involving forging, annealing, machining, etc., have been satisfactory.

Speaking on "Expansion Program of the Steel Industry," J. A. Kinney, assistant to vice president, Bethlehem Steel Co., Bethlehem, Pa., pointed out the increase in annual open-hearth ingot capacity through the WPB steel expansion program of 7,235,000 tons, represents an increase of 9.2 per cent over capacity as of Jan. 1, 1942.

In a paper "Increased Blast Furnace Capacity and How Accomplished" presented by G. T. Williams, superintendent, blast furnaces and coke plant, Indiana Harbor works, and B. M. Stubblefield, superintendent blast furnaces and coke plant, Campbell works, Youngstown Sheet & Tube Co. the fact was brought out that successful tapping of the salamander will save 14 days of relining time on the average.

E. C. Wright, chief metallurgist, National Tube Co., Pittsburgh, in presenting his paper "Plant Production Problems Presented by Sustained High-Level Operations" mentioned that scrap now being collected from miscellaneous sources is lower in quality and also smaller in size. As a result of present scrap deficiencies, open-hearth furnaces have had to increase the amount of iron charged, and in many cases this has now reached the level of 70 per cent of the total charge.

F. E. Vigor, general transportation manager, American Rolling Mill Co., Middletown, O. speaking on "Wartime Scrap Problems" estimated alloy turnings are appearing at the rate of 200,000 gross tons, and carbon turnings at about 400,000 gross tons per month. Turnings will be about 30 per cent of total volume of purchased scrap that must be obtained during 1943.

J. S. Richards, director of research, American Steel & Wire Co., Cleveland speaking on "The Wire Industry and the War Effort" announced one of the outstanding achievements of the wire industry has been development of highgrade spring wire to eliminate dependency of the nation upon Sweden for this product.

He drew attention to the sensational rise in the output of welding wire. During the last half of 1941, a total of 5,471,541 pounds of stainless welding electrodes was produced; during the comparable period in 1942, it was 19,831,222 pounds, an increase of 262 per cent. Total of all welding electrodes during last half of 1941 was 209,154,319 pounds; in 1942, last half, it was 384,788,738 pounds, gain of 84 per cent.

H. W. McQuaid, assistant chief metallurgist, Republic Steel Corp., Cleveland, speaking on "Wartime Production of Constructional Steels in Basic Electric Furnace" was of the opinion each melter should make a special study as to what constitutes the ideal charge. It seems to be the general opinion that a small amount of light scrap is desirable on the bottom of the furnace inside the electrode circle. If possible, the heaviest scrap should be directly under the electrodes.

C. H. Herty Jr., assistant to the vice president, Bethlehem Steel Co., Bethlehem, Pa., speaking on "The Conservation of Critical Materials" stated consumption of manganese per ton of steel is increasing due to increased tonnage of alloy steel being produced and greater use of manganese as an essential element in its substitution value for more critical elements, particularly chromium and molybdenum.

Use of Roll Scale Gains

An American Iron and Steel Institute survey on fluorspar consumption indicates a considerable amount of conservation has been accomplished by the increased use of roll scale and efforts to prevent the unnecessary use of spar.

H. J. Forsyth, Republic Steel Corp., Buffalo district, speaking on "Effects of Temperature on Blooming Mill Production of Hot-Topped Steels" showed that the effects of temperature remained constant regardless of the time ingots had been soaked before rolling, and this indicates that long heating cycles have little value in expediting rolling unless temperature is closely controlled.

Ingots from bare molds heated with good temperature practice produced billets which required 62 per cent more scarfing than those produced by ingots from coated molds heated in the same soaking pits. At lower soaking temperatures, bare molds increased scarfing by 100 per cent. On the other hand, high and low soaking temperatures produced only 18 per cent difference in conditioning on product from coated molds as compared to 58 per cent on product from bare molds.

LOOK TO SINTER

Anticipating approximately 30,000,000 tons of sintered iron ore will be needed for next year's war production, the War Production Board is investigating greater use of idle cement kilns to "sinter" iron ore.

Government is sponsoring tests to determine the value of this method for creating an additional charge for blast furnaces.

Anticipated shortages this summer due to delays in lake transportation and curtailment of imports necessitate finding additional blast furnace charge, WPB states.

Conversion of cement kilns to sintering requires no extensive mechanical change, and process is not new to industry, WPB explains. England, France, and Belgium have used kilns for this purpose for years. WPB is listing available cement kilns is also seeking location of large quantities of waste material from chemical manufacture for reduction to ore.

Dollars and Cents Prices To Be Established on All Steel Products

Shortages will be largely eliminated by fourth quarter, distributors are told by Services of Supply officer at thirty-fourth annual convention. . . Inventory position continues to improve with stocks still on upswing

NEW zoning plan establishing dollars and cents prices on iron and steel products sold out of warehouse has been completed by the Office of Price Administration and will be placed in effect for the entire country as soon as possible.

Announcement was made by E. L. Wyman, head, Warehouse and Jobbers Section, Iron and Steel Branch, OPA, speaking before members of the American Steel Warehouse Association at their thirty-fourth annual meeting in New York at the Plaza hotel last week.

Prices for zones 1 to 4, inclusive, covering the Eastern Seaboard, already have been issued and those for zones 5 to 10 covering the entire Central and Midwestern areas now are being printed for issuance June 10, taking effect June 21.

Price regulations for the zones covering the Southeast, Southwest and Pacific Coast area have been discussed with industry representatives and will be put into amendment form by OPA by the middle of July, Mr. Wyman said.

Under the new setup, shipments from any point within a zone to a destination within the same zone will be made at the zone destination price for that zone. In other words, regardless of where the material is shipped from, there is one dollar and cents destination price applicable.

On shipments from a shipping point within a zone to a destination within another zone, the shipper has the choice of three alternatives: He may charge the zone destination price for the zone into which shipment is made; if he ships by freight he may charge his own zone shipping point price, plus freight from shipping point to destination, less an allowance of 15 cents per 100 pounds; or if he ships by any other method of transportation he may charge his own shipping point price, plus transportation charges actually paid from shipping point to destination, less an allowance at the rate of 25 cents per 100 pounds.

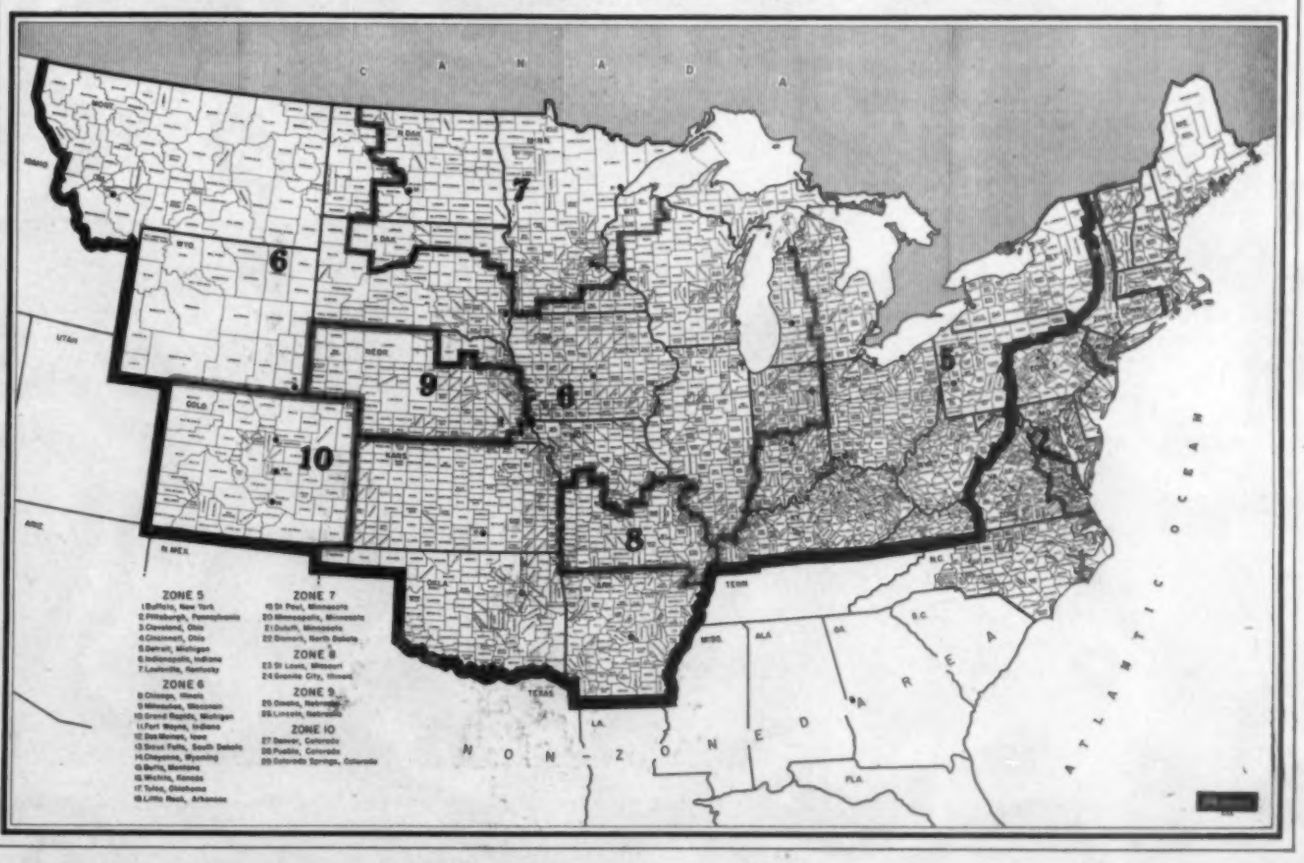
The last alternative is not now in effect but will become effective June 21 and will be contained in Amendment 15 to PS 49. It enables the seller when shipment is made by truck or other than by freight to pass on to the buyer any excess over the rail rate, less 10 cents per hundred. Thus the seller is virtually compensated by any such difference in cost of transportation. At the same time, there is no incentive for diverting shipments which normally would be made by rail to truck.

Mr. Wyman explained that zone price components under the specific provisions of the amendment are set forth so that prices may be readily established. Opposite each product listed is shown a reference to tables or columns covering the following:

1.—Basing point.
2.—Price at basing point.
3.—Freight.

WAREHOUSE STEEL PRICE ZONES

Based on Revised Price Schedule No. 49 - Resale of Iron or Steel Products



4.—Spread.
5.—Quantity.
6.—Quality and merchandising extras.
7.—Size extras.
8.—Cutting extras.
9.—Miscellaneous extras.

Sum of these factors expressed in dollars and cents establishes a zone destination price at any point within a zone, he said. All a seller or buyer needs to establish a price, outside of the information in these columns or tables, is current freight rates.

In his address, Walter S. Doxsey, president of the association, declared that warehouse inventories are "still on the upswing". During most of 1942, he said, steel was flowing out of warehouses faster than replacements were being delivered. By September, stocks had dropped to 68.7 per cent of the December, 1941 level and directives on the mills came just in time to avert a catastrophe. These directives authorized production of stipulated tonnages for delivery to warehouses.

By the end of 1942, inventories had recovered to 90.6 per cent of December, 1941 and by March 31 of this year were up to 122.1 per cent, he said.

Carbon Steel Shortage

Hiland G. Batcheller, director, Steel Division, WPB, in a brief address stressed a point made on two or three other occasions recently. Despite reports to the contrary, he said that the steel situation is not "easy" and will not be easy as long as the war lasts.

He again quoted figures indicating a possible shortage of 5,000,000 tons in carbon steel requirements for third quarter based upon an available supply of 18,000,000 tons as contrasted with requirements of 23,000,000 tons. Even if the 5,000,000-ton figure is somewhat inflated, the shortage for the period will be at least 2,000,000 tons.

Idle and excess stocks of steel in this country have been cut to approximately 600,000 tons, declared A. Oram Fulton, consultant, WPB Steel Division. Of this total, about two-thirds is in the form of sheets, strip and structurals.

Mr. Fulton thought that since Pearl Harbor and up to the end of Steel Recovery Corp. operations, in the vicinity of 4,000,000 tons of idle and excess steel in primary forms or partially or wholly fabricated will have been moved from the plants where it was dormant and put into war channels.

George L. Stewart, president, Steel Recovery Corp., Pittsburgh, said all the good material which was included in the stock of idle and frozen steel now has been taken by industry and all that is left is a "conglomeration of cats and dogs". The corporation, however, will make every effort to dispose of this material and will finance any additional processing which may be necessary, such as rerolling, annealing, shearing, etc.

The San Francisco plan for pooling information on warehouse inventories is working out well, R. D. Cortelyou, secretary, Northern California chapter of the warehouse association said.

In practice, Mr. Cortelyou said, steel consumers usually try their usual source of supply first and, if unsuccessful in obtaining the material desired, then call the Warehouse Section. In the first month of operation, the Section distributed 1,782,129 pounds of material and was unable to supply 1,154,820 pounds requested.

J. R. Stewart, chief, Warehouse Branch, Steel Division, WPB, Washington, conducted a question and answer session. It probably will be necessary to amend the orders now controlling warehouses, namely CMP Regulation No. 4, M-21-b-1 and M-21-b-2, he said, for the reason that the CMP program is not solidified. Amendments to the warehouse orders will be necessary to bring them in line with the program.

Merrill Stubbs, recently appointed chief of the Industrial Salvage Branch of the Salvage Division, WPB, said that our scrap supply is in balance mathematically but badly out of balance by grades. Alloy steel production this year, he said, will be 14,500,000 tons out of a projected total steel production of all types of about 93,000,000 tons. Production of alloy borings and turnings as scrap will total about 1,500,000 tons along with output of around 3,500,000 to 4,000,000 tons of carbon steel borings and turnings.

There is too much of this light material and not enough heavy scrap, he said. The situation is so serious that if the present trend in supplies continues steel production will be adversely affected in two to six months. Combined yard and mill stocks totaling 7,697,000 tons as of the first of the year did not represent a true picture since a large share of the material was of poor quality. It was not distributed well geographically as indicated by the fact that a large mill in the Great Lakes now is down to less than 12 days' inventory and is asking for high-price allocations.

Price Control "Saved Billions"

Steel consumers would have paid many billions of dollars more for their requirements in World War II than in World War I were it not for price control, declared Donald D. Kennedy, Price Executive, Iron and Steel Price Branch, Office of Price Administration.

In discussing the future, Mr. Kennedy said any abandonment of price control in iron and steel products in particular or in all industrial materials and cost of living items in general is unthinkable. It is an alternative which would lead to disaster.

Steel shortages will be largely eliminated by the fourth quarter of 1943, Lieut. Col. Joseph P. Woodlock, U.S.A., chief, minerals group, material branch, Services of Supply, told members.

Plant facilities to produce the shapes and sizes of semifinished steel demanded by specialized army requirements were inadequate, Colonel Woodlock said, and it was necessary to convert existing fabricating facilities and provide for additional steelmaking capacity. The latter required over 5,000,000 tons of steel alone.

Luncheon meeting for members of the American Steel Warehouse Association during the thirty-fourth annual convention of the group at the Plaza hotel, New York

WPB Completes Organization of Controls Bureau

ORGANIZATION of the Production Controls Bureau and assignment of principal functions to its organizational units has been completed, J. A. Krug, program vice chairman of the War Production Board, announced last week.

The bureau, of which Harold Boeschenstein is director, consists of the following four organizational units: (1) Office of the Director, (2) Controlled Materials Plan Division (3) Scheduling Production Division, and (4) Inventory Policy Division.

The Production Controls Bureau develops policies, plans, and general methods for controlling distribution of materials, for scheduling production and delivery of products, and for controlling inventories. These plans and policies are subject to review of the program vice chairman.

Operating methods and procedures relating to distribution, redistribution, scheduling, and inventory control formulated by the controlled materials divisions and the operations vice chairman are subject to approval of the Production Controls Bureau for the program vice chairman before they are put into operation.

Director Initiates Regulations

The director is primarily responsible for initiating appropriate priorities regulations, CMP Regulations, regulations to govern scheduling, and other regulations applicable to more than one industry for controlling the distribution of materials, for scheduling production and delivery of products, and for controlling inventories.

The Controlled Materials Plan Division is charged with recommending policies, plans, and general methods for controlling the distribution of materials, and for maintaining a continuous review of the overall operations under resulting directives.

The Production Scheduling Division is responsible for recommending policies, plans, and general methods of scheduling production and delivery of products.

Specifically the Division will: (1) Aid and advise the controlled materials divisions, the office of operations vice chairman, and claimant agencies in the installation and operation of scheduling systems; (2) Receive from operating officials of WPB and claimant agencies recommendations for improvements in scheduling policies, plans, and methods; (3) Review, coordinate and approve standard forms, operating methods and procedures for the effectuation of systems for scheduling production and delivery; (4) Advise the program bureau on program questions arising from the scheduling of critical products.

The Inventory Policy Division is responsible for recommending policies to govern adjustment of or limitation of industrial inventories, and for maintaining a continuous review of overall operations with respect to such industrial stocks for the purpose of recommending long-range control plans.

Present, Past and Pending

■ RESHUFFLING OF PRODUCTION REFLECTED

NEW YORK—Reflecting changes on the fighting fronts necessitating reshuffling of production schedules, Baldwin Locomotive Works and American Locomotive Co. have been taken out of tank production 100 per cent and put back on their normal job of building locomotives.

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■ BATTLE DEMANDS TO NECESSITATE CHANGES

WASHINGTON—Gen. L. D. Clay, director of materiel for the Army, reveals one major foreign customer (presumably Russia) recently canceled its tank orders but asked for railway equipment. He says war production will not undergo overall reduction this year or next but many changes will be necessary in adjusting to battle demands.

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■ ALLOT STEEL FOR HARVESTING MACHINES

WASHINGTON—War Production Board has allotted steel for an additional 18,690 harvesting machines. Expectations are 55,000 units will be delivered in time for the 1943 harvest. Also, WPB plans to allow agricultural equipment builders to operate next year at 80 per cent of 1940 levels.

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■ NEW PIPELINE TO TAKE BIG STEEL TONNAGE

KANSAS CITY, MO.—Immediate construction of a pipeline to insure adequate natural gas supplies next winter for the Mid-continent area bounded by Wichita, Kans., Kansas City, and Springfield, Mo., is planned by Cities Service Co. It is estimated 55,000 tons of steel will be required.

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■ LATIN AMERICA SEEN AS MARKET FOR TRUCKS

NEW YORK—R. D. Hilty, vice president, Mack Trucks Inc., says future development of Latin American highway transportation will contribute substantially to American truck demand. He feels within ten years Latin American countries will buy close to 1,500,000 trucks from this country.

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■ MILITARY NEEDS BOOST TRUCK-TRAILER DEMAND

DETROIT—Use of truck-trailers, which had been increasing rapidly prior to the war, has been greatly stimulated by military transport needs for highly specialized transport equipment.

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■ DAIRY EQUIPMENT SALES LOSS NOT OFFSET

CHICAGO—Government restrictions on sale of equipment and machinery for dairy plants is causing loss in sales volume which has been only partially offset in the industry by sales of war materials.

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■ SCRAP PRICE SCHEDULES TO BE AMENDED

WASHINGTON—Twelve amendments to various scrap price schedules have been drafted and will be issued soon, according to unofficial reports. It is understood that the amendments, the first made for some time, will not effect any vital change in the schedules.

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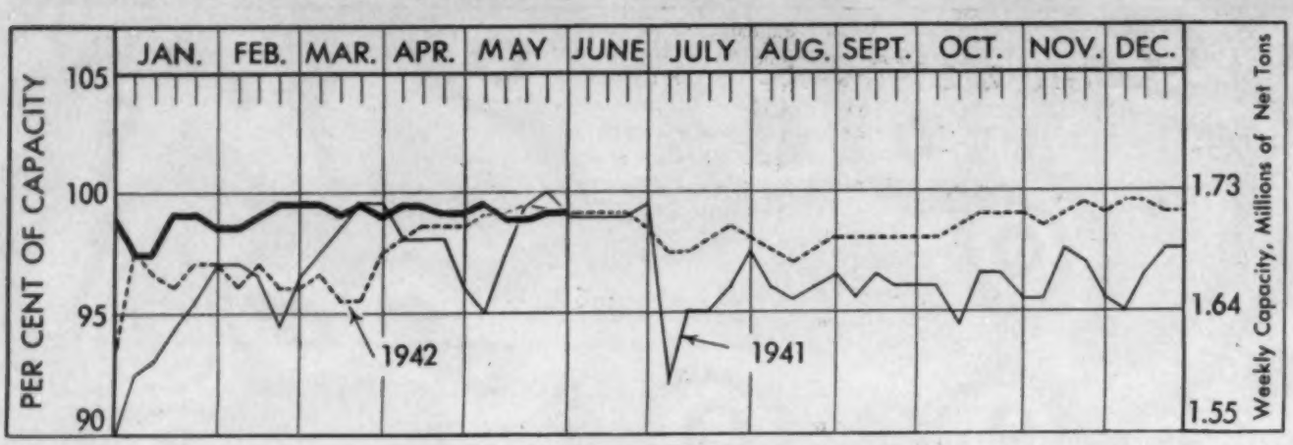
■ STEELMAKERS CONCERNED OVER ORE SUPPLY

CHICAGO—Due to late opening of navigation on Great Lakes the steel companies are concerned over next winter's ore supplies. Fears are expressed of a shortage early next year.



STEEL INGOT PRODUCTION BY MONTHS

Net Tons, 000 omitted

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1943	7,408	6,811	7,670	7,374	....	....	....	....	....	....	....	....
1942	7,124	6,521	7,392	7,122	7,386	7,022	7,148	7,233	7,067	7,584	7,184	7,303
1941	6,922	6,230	7,124	6,754	7,044	6,792	6,812	6,997	6,811	7,236	6,960	7,150

PIG IRON PRODUCTION

1943	5,194	4,766	5,314	5,035	....	....	....	....	....	....	....	....
1942	4,983	4,500	5,055	4,896	5,073	4,935	5,051	5,009	4,937	5,236	5,083	5,201
1941	4,666	4,206	4,702	4,340	4,596	4,551	4,766	4,784	4,721	4,860	4,707	5,014

Plants To Close

Shifting war needs will force shutdowns in some areas, increased activity in others

DECLARING that America now has the machine tools and capital equipment "to keep production at victory levels," WPB vice Chairman William L. Batt warned that shifting needs of America's war machine will result in plant shutdowns and actual unemployment in some areas and increased manpower shortages in others.

Addressing the National Electrical Wholesalers Association's War Conference, the WPB official said, the increase in America's manufacturing capacity, which had taken 3,000,000 men from our labor force at one time is no longer called for. When steel is needed for such all-important items as ships and guns it is no longer wise to divert 20 to 24 per cent of the nation's steel to construction.

Aircraft, ships, escort craft, high octane gas and synthetic rubber, the "must production of today" will come first with WPB, Batt asserted.

He attacked "the growing assumption that the material situation is growing easier, and that before long, we will be able to return to production of our old lines of civilian goods."

Production of 6932 tons of steel, enough for 4,600,000 helmets for the armed services, was achieved during a 24 hour period by the crew of the 44-inch slabbing mill at South Works, Carnegie-Illinois Steel Corp., Chicago.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended May 29	Change	Same week 1942	Same week 1941
Fittsburgh	99	None	94	100.5
Chicago	97	+0.5	107	100.5
Eastern Pa.	95	None	91	96
Youngstown	97	None	94	97
Wheeling	93	None	78	88
Cleveland	96	None	94	96
Buffalo	93	+2.5	90.5	93
Birmingham	100	None	95	95
New England	90	—0.5	95	90
Cincinnati	84	—10	95	92.5
St. Louis	87	—3	98	98
Detroit	94	—2	92	92
Average	99	None	*99	*99

*Computed on bases of steelmaking capacity as of those dates.

Ingot Rate 99%

Steelworks operations hold steady. One additional stack blown in

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week was at 99 per cent of capacity, unchanged from the preceding week. Two districts gained slightly, four declined and six maintained unchanged rates.

A year ago and two years ago the rate was also 99 per cent.

Hanna Furnace Corp. has relighted its fourth blast furnace stack at Buffalo after relining. This stack went down April 1.

Slight Decline in Total Scrap Stocks

IRON and steel scrap stocks held at consumers', suppliers' and producers' plants approximated 6,850,000 gross tons March 31, or slightly below the 6,871,000 tons reported at the close of the preceding month, the Bureau of Mines states.

Decline in consumers' stocks of 1 per cent offset a very slight gain in suppliers' and producers' inventories.

Consumption of scrap in March totaled 4,787,000 gross tons, an increase of 15 per cent over the February figure of 4,178,000 tons.

There were minor changes in the proportions of total scrap and pig iron charged to various types of furnaces in March compared with the calendar year 1941. Open-hearth furnaces which in 1941 used proportions of 19.3 per cent purchased scrap, 29.1 per cent home scrap, and 51.6 per cent pig iron, in March 1943 showed proportions of 17.5, 29.2 and 53.3 per cent respectively.

On a daily average basis consumption of scrap and pig iron during March was 2 per cent greater than February, aggregating 9,447,000 gross tons against 8,340,000 in the shorter month.

Comparison of stocks and consumption of scrap and pig iron on a monthly basis are presented in the table below.

Stocks at end of Month

(000 omitted)

		Scrap		
		Purchased	Home	Pig iron
Mar.,	1943	5,343	1,507	1,350
Feb.,	1943	5,354	1,517	1,370
Jan.,	1943	5,401	1,476	1,302
Dec.,	1942	5,501	1,429	1,272
Nov.,	1942	5,363	1,379	1,191
Oct.,	1942	4,956	1,304	1,130

Consumption during Month

		Scrap		
		Purchased	Home	Pig iron
Mar.,	1943	2,102	2,685	4,660
Feb.,	1943	1,857	2,321	4,162
Jan.,	1943	1,942	2,550	4,515
Dec.,	1942	2,016	2,481	4,465
Nov.,	1942	1,905	2,496	4,360
Oct.,	1942	2,061	2,709	4,594

Installed Machine Tool Plant Can Support $220 Billion Income

Frederick Geier tells group estimate is based on current capacity in comparison to peacetime production . . . Equipment now in use mostly new

IN TERMS of national income, the installed machine tool plant of the nation after the war will be sufficient to support an income of $220 billion, Frederick V. Geier, president, Cincinnati Milling Machine Co. told the twenty-seventh annual meeting of the National Industrial Conference Board roundtable on planning in the manufacturing industries at New York, May 26.

This estimate is based on production of 65 to 75 in ratio to one dollar machine tool capacity operating on normal schedule found to be average over period of peace time year. Based on an average of 75 the postwar machine tool capacity could support a national income of 250 billion dollars far in excess of any national income goal yet suggested or hoped for.

Average age of tools now in operation has been greatly lowered. In 1940 of tools available, 70 per cent were over 10 years old. This year 33 per cent are under 36 months. The nation will be at least two thirds equipped for full operations, probably more so with general purpose tools and only some special purpose machines will be required after return to peace. Most of the equipment will be relatively new, probably three fourths.

Few Worn Out

Few machine tool builders, according to Mr. Geier, believe these tools will be worn out by war operation and most of them can be maintained at high efficiency by minor repairs and part replacements.

A large per cent of general purpose machines will be adaptable to peace operations at least one half of them. Installed tools will continue to yield low enough costs to enable industry to continue progress in efficient production. Confronted with large productive capacity Mr. Geier said some builders were considering the manufacture of other products after the war.

Some will develop new lines but many will strive to engineer new tools for better accuracy, increased efficiency and production and economical operation.

The war has stressed the importance of the machine tool industry and it will be needed in time of peace, Mr. Geier stressing the big job ahead, stating the industry has known lean years before with capital turnover by the industry outstandingly slow in normal years.

S. Clay Williams, chairman, R. J. Reynolds Tobacco Co. was elected chairman of the Conference Board for 1943-44; vice chairmen for one year Neal Dow Becker, president Intertype Corp., Col. F. G. Drake, President, Gulf Oil Corp., Edgar M. Queeny, chairman, Monsanto Chemical Co. and Langbourne M. Williams Jr., president, Freeport Sulphur Co.

Alters Rules on Purchase Of Controlled Materials

In some instances where a controlled material producer requires the same basic material as that which he produces to fabricate another form of controlled material, such material may be made available through the allotment procedure rather than by directive.

This has been provided by an amendment to CMP Regulation No. 8, covering production requirements of controlled materials producers. The regulation originally indicated that all such material would be made available to controlled material producers only through directives.

Requests for Some Metals Placed on Kilogram Basis

Future requests for tantalum, molybdenum and tungsten are to be made in terms of kilograms instead of pounds avoirdupois, Steel Division, WPB, announced last week. Requests for tungsten and molybdenum chemicals and powder should continue to be reported in pounds on PD-9-c and PD-360.

Date for filing forms PD-487 and PD-488 for allocations of tantalum has been changed from the 20th to the 7th of the month preceding the month for which application is made.

Restrictions on Use of Tin Modified by WPB

Under certain limited conditions the use of tin and tin alloys for coating steel wire is permitted.

Numerous changes have been made in the permitted tin contents in brass and bronze as provided for in Schedule 1.

Use of 38 per cent tin solder for wiping lead pipe joints in making connections with outside mains has been permitted because of the pressure at these connections.

Exemptions heretofore granted permitting use of genuine babbitt in repair and maintenance of mining and quarrying machinery have been withdrawn.

The order now permits use of: pure tin coatings on all copper wire .0320-inch nominal diameter and finer and a 12 per cent tin alloy coating on thicker copper wire where these coatings are required to meet performance specifications.

Brass Mills May Extend Some Customers' Ratings

A brass mill may accept an authorized controlled material order for a brass mill product which it does not produce, but only if it first can arrange to have the required item produced by another mill, War Production Board announced.

In such cases, the allotment number or symbol appearing on its customer's authorized controlled material order may be extended by the brass or wire mill to the order which it places with another mill.

Under established CMP procedure, extension of customers' allotments or ratings by controlled materials producers is not permissible. Supplementary direction 9 to CMP regulation No. 1 provides an exemption from the general rule under the conditions specified.

The direction expressly provides, however, that the material may not be used in any way by the brass or wire mill which places the order and is not to be included in reports to the War Production Board as an order which it received or filled. The mill which actually produced the material reports acceptance and shipment.

Small Lots of Calcium Exempted from WPB Control

Industrial users of calcium metal may obtain small quantities for consumer use under an amendment of conservation order M-303, issued by the War Production Board. The original order, effective as of April 1, established control over all uses of calcium metal. Now, however, those industrial users who require small quantities are permitted to accept and use three pounds of calcium in the form of carrots (an impure form of the metal) or two pounds of the metal in any other form per month without specific authority of the WPB.

WINDOWS of WASHINGTON

See Orderly Change

PREVAILING opinion of leading postwar planners here is that the products that will be made immediately after this war will be pretty largely the very same items that were made when civilian production lines were converted to war—that changes will come about in these products in the postwar period in the same orderly way in which they were effected in normal times of the past. In brief, it is not believed many rabbits are going to be pulled out of the hat in the immediate postwar period—it is believed that manufacturers can plan more soundly if they take this viewpoint.

Labeled Exports

A reader of STEEL recently asked just how Lend-Lease shipments abroad are classified by the government—that is, whether they are included in exports. The answer is that Lend-Lease shipments are reported, along with regular commercial shipments abroad, under the heading of exports. However, shipments direct to American armed forces abroad are not included under the head of exports. They are considered to be in the same category as regular domestic shipments.

Size Helps Here

Small contractors are seldom affected in administering the price renegotiation law, Congressman Patman informed the House on May 17. As an example he cited the record of the Navy Price Adjustment Board which has cleared without renegotiation 240 "small" companies holding a total of about $500,000,000 in contracts. On the other hand, it required about 120 "big" companies holding $13,000,000,000 of war contracts to reduce their excessive profits. He further brought out the fact that no contractor has exercised his legal right to appeal findings of the price adjustment boards.

Unions Disapprove

When the House Labor Committee recently held hearings on the Woodruff and Landis bills, the only witness who favored either was Congressman Landis. Numerous witnesses representing labor unions denounced both bills as an approach aimed at destruction of the union movement.

The Landis bill would require publication of information about the financial condition of unions. T. R. Owen, CIO United Rubber Workers of America, said this would place vital information in the hands of the "enemy", meaning employers. A provision of the bill would prevent unions from making political contributions.

The Woodruff bill, which would prevent aliens from having a voice in determination of union policies, was objected to by union leaders and representatives of the foreign-born. They claimed many aliens cannot meet strict citizenship requirements but practically to an individual they regard themselves as loyal Americans. Destruction of their positions in their unions, it was declared, might take the edge off their enthusiastic loyalty.

ENGLISH GETS NOD

Representatives of the State Department report remarkably increased interest in the English language throughout Latin America. The Brazil-United States Institute, established in 1941, now has upwards of 300 leading citizens who are friends of the United States.

In many secondary schools in South America English now is an obligatory subject. Almost 90 per cent of high-school students in Ecuador are studying English. Haiti last October passed a decree making English a compulsory subject in all schools above primary grade.

In many cases large numbers of students who desire to learn English are held back by scarcity of teachers.

Lend-Lease Millionaires?

Are the eighteen billions of dollars appropriated for Lend-Lease financing helping create new millionaires in countries allied with us in the war? Congressman Robert F. Jones (R), Lima, O., who has been conducting a one-man investigation of spending under Lend-Lease Administrator Edward R. Stettinius Jr., raised this question recently. A case in point involves a steel company described by the Department of Commerce as the biggest in India.

Learning goods ordered by this company in the United States are paid for from Lend-Lease funds, Mr. Jones wants to know, "the effect of the enhancement of the credit of this company through Lend-Lease funds", and whether the directors of this company, which made net profits of nearly $9,000,000 last year are to become even richer through funds furnished from the American taxpayers' pockets.

Effective Movies

Preliminary arrangements have been made by the State Department with United States Steel Export Co. and the General Motors Corp. whereby the latter will rescore some of their promotional motion pictures in the Portuguese and Spanish languages in order that they may be exhibited more effectively in the Latin American countries as part of the over-all effort to interest citizens of those countries in American products. Other companies will be encouraged to take similar action. The State Department offers to supply translations and language commentators.

Using More Wood

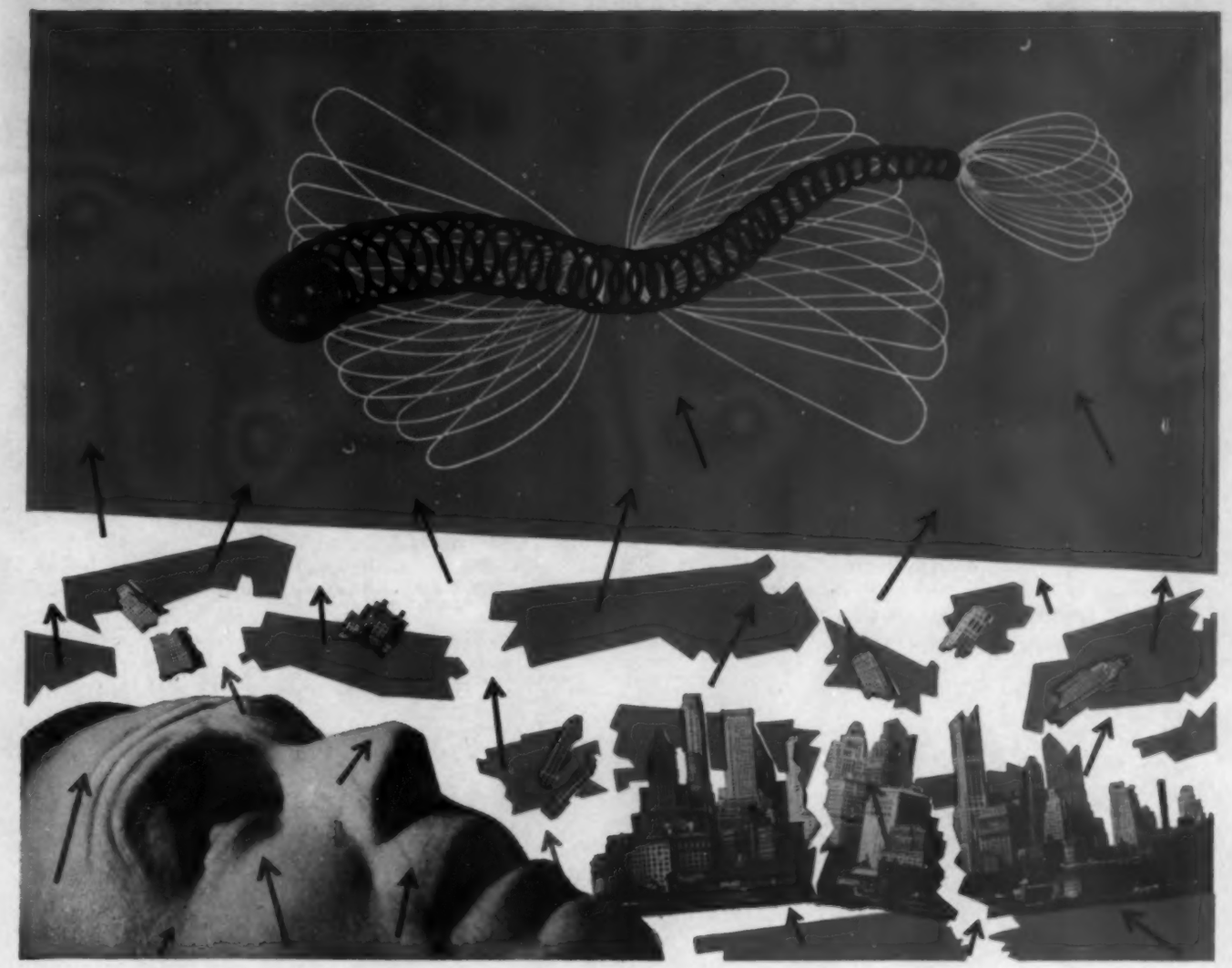
The United States is using more wood during this war than steel. According to Under-Secretary of War Robert W. Patterson, 120,000,000 tons of wood were used in 1942 whereas total steel ingot production was 86,029,921 tons. Much wood went into cantonments, barracks, bridges and manufacturing plants last year. Wood requirements this year should be smaller than last, whereas there continues to be no lessening in demand for steel.

Home Dehydrators

Department of Agriculture's food dehydration program includes provisions for approximately 100,000 small food dehydrators to permit housewives to preserve food which otherwise would be wasted. A number of manufacturers have submitted sample dehydrators which they will manufacture when and if they receive approval. In the meantime Tennessee Valley Authority has brought to Washington a dehydrator developed in co-operation with the Rural Electrification Administration and Southern land-grant colleges. It is a wood and insulation-board cabinet and contains five 200-watt electric bulbs to provide heat, also a fan, driven by a one-fortieth horsepower electric motor to circulate heated air over eight glass trays containing fruits and vegetables to be dehydrated. The unit contains less than two pounds of critical metals, including steel in the fan and motor and the nails used in constructing the cabinet—and a small amount of copper in the motor.

Pass Knowledge on

The Civil Aeronautics Administration during the calendar year 1942 provided instructions for some 484 citizens of the other American republics in the various branches of aviation, including training as pilots, administrative engineers and mechanics. Courses included radio engineering, meteorology.



If worms had wings . . .

IF WORMS HAD WINGS, chances are our entire economy would collapse! All because their specialty—that of swallowing earth—is unique and indispensable!

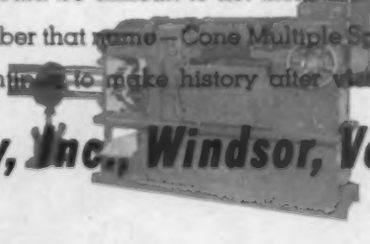
The earthworms in a single acre of ground carry more than 18 tons of earthy castings to the surface in a year! Thus, by constant plowing, they make it possible for air, moisture and life-giving minerals to circulate . . . and so for all plant-life to flourish!

But if worms had wings, they'd never be satisfied with so plebeian an occupation as burrowing. They'd just fly around. And in the meantime, the whole world would go to pot.

The moral is plain: Specialization is of so great importance that our modern world could not survive without it. Our democracy could not fight without it. Take machine tool production. We have overcome Germany's 7-year head start in about a year, and are even now outproducing the Reich in machine tools in the ratio of 5 to 1.

A potent factor in this production miracle has been the multiple spindle automatic lathe made by Cone. These titans of the machine tool industry are currently used in the production of so many different munition parts it would be difficult to list them all.

Remember that name—Cone Multiple Spindle Lathe. It will continue to make history after victory is won!



CONE Automatic Machine Company, Inc., Windsor, Vermont

Urges Sponge Iron Industry

Governor of North Carolina tells Boykin Steel Shortage Committee state's 100,000,000 tons of ore can be utilized by direct reduction process

NORTH CAROLINA, according to results of reliable surveys, has well over 100,000,000 tons of high-grade iron ore and wants to encourage iron and steel production within her boundaries by the method of direct reduction of this ore to sponge iron, "using hydrogen gas or other low cost fuel instead of coking coal," Governor J. Melville Broughton of that state told the Boykin Steel Shortage Investigating Committee on May 20.

Governor Broughton asked the committee to exert its good offices to persuade the Bureau of Mines to confirm the findings of its own surveys by drilling the ore bodies and analyzing samples, and later issuing an authoritative report which could be used by the state in enlisting private capital to launch an iron and steel venture.

Herman Brassert, who accompanied Governor Broughton, evidently in the capacity of consultant, and who previously had testified before the committee that iron and steel can be produced commercially by the sponge iron process, estimated that it would cost the Bureau of Mines about $75,000 to do this work—an amount which Governor Broughton declared he was "ashamed" to mention in Washington these days.

Hope for Ore Exploration

The committee declared that it would proceed the next day to visit the Bureau of Mines in a body, accompanied by the entire North Carolina delegation in Congress, and urge immediate launching of an iron ore exploration program in that state.

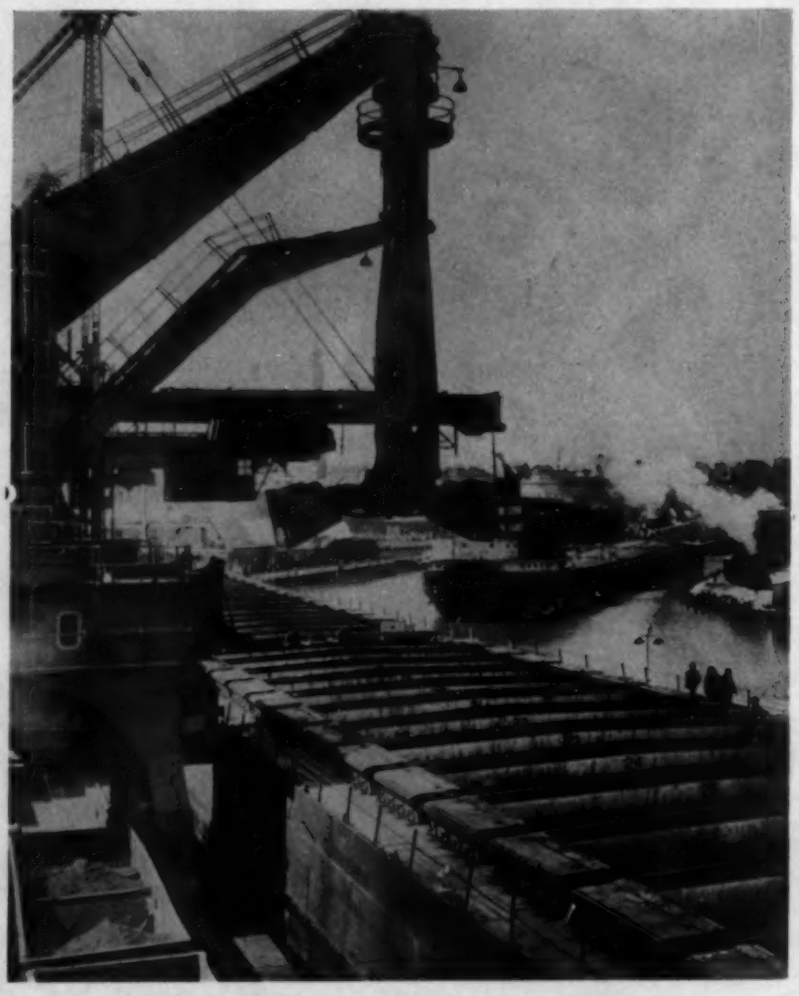
It is rather interesting to note that when Governor Broughton was asked to stay over and join the party he expressed his regret and explained that he was due back in his state the next day to be on hand at an historic event, the trial flight of the first airplane to be constructed of plywood—and North Carolina plywood at that.

It is worthwhile to present some of Governor Broughton's testimony in detail because it is so typical of the present thinking in the Southern and Southwestern states that have been industrialized on a large scale during the war—and where the people in general are determined not only to keep these industries alive after the war but to expand them further.

Foremost in Governor Broughton's mind was the fact that monopoly has been greatly strengthened by the war and he was deeply concerned over the fact that virtually 70 per cent of the whole volume of the nation's war contracts are in the hands of about one hundred companies. He praised the record of American industry in this war and admitted that some of the largest industrial companies have made notable contributions to the victory program.

"We must, however—if we are to continue as a great nation in which free enterprise may thrive—give more vigorous thought and action towards the effort to give small business and industry a chance to live and grow," he declared. "The basis of our American economy has been what we call, for want of a better term, small business. . . . Small business can be large enough to give wide opportunities to our people for honest labor, large enough to contribute greatly to the prosperity of a community and all of its citizens—and yet too small to dream of Napoleonic dictatorship over the whole industrial field in which it is situated, too small to be a menace to other legitimate business enterprise, too small to crush all competition, too small to be a danger to our democracy."

The state of North Carolina, he explained, suffers from a number of things. One of these handicaps is a freight rate structure that prevents employment of a much larger number of skilled workers than now are on industrial payrolls in the state. The freight rates are such, he said, as to encourage



UNLOADER BITES 15-TONS OF IRON ORE

THIS Hulett unloader is ready to remove a 15-ton bite of iron ore from a steamer that arrived in Cleveland harbor from Superior, Wis. Across the river a self-unloader vessel deposits a cargo of foundry sand shipped from Muskegon, Mich. Wide World photo

shipment of raw materials from the state to other areas rather than convert them into the ultimate product before shipping them to other states.

For example, he said, North Carolina has the finest deposits of quartz in the world, and the government specifies North Carolina quartz for manufacture of optical glass for precision instruments. It mines the quartz and ships it for processing to points in New York state, the District of Columbia and elsewhere. That is, the North Carolina workers employed in this industry get common wages whereas much higher wages are paid to skilled workers at the optical glass plants. This brings about a lower average purchasing power for the people of North Carolina than in states where manufacture is encouraged. The same condition applies to mica which, he said, is shipped out raw and processed in other states, mainly in the North.

Ore Bodies Are "Frozen"

As an example of the way in which North Carolina suffers from monopolistic practices in the steel industry, as Governor Broughton put it, large companies own large iron ore deposits in the state which they purchased twenty or more years ago. Had they bought with the purpose of using the ore on the ground, thus providing industrial employment and helping to round out the state's economy, he declared, no fault would have been found. However, the steel companies which purchased the ore bodies did not buy for that purpose; rather they bought these bodies to "freeze" them, keeping them in reserve for use when reserves at other properties had been exhausted.

"We have won at every point so far", he said, "and we think that we are going to get what we are asking for. We think that we will have a final, and favorable, decision sometime this fall. If that is the case we are going to make great progress. With the sponge iron process, with an adequate power supply, with plenty of labor and plenty of natural resources, we expect to see our industries go forward."

Another thing to take into account is the fact that iron ore exists in plentiful quantities in twenty-six states of the union. If the sponge iron process turns out to be as good as Governor Broughton apparently thinks it is, there may be profound effects upon industry in general. Most informed metallurgists are agreed that the sponge iron process still is in an experimental stage and that it remains to be proved commercially. At the same time, with so many minds—including those of the Bureau of Mines—so seriously at work on the problem, it cannot be ignored.

Plan Construction of New Sintering Plant

Erection of a Greenawalt sintering plant is planned at Tahawus, N. Y., near Port Henry. Turner Construction Co. will be in charge of construction. The plant will be financed by the Defense Plant Corp. and operated by the National Lead Co. on ores obtained from the company's McIntyre development. It will have daily capacity of 1800 tons suitable for blast furnace and open hearth use.

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Steacy-Schmidt Mfg. Co., Elmira, N. Y., has changed its name to Hardinge Mfg Co. This involves no change in management or policy. Hardinge Mfg. Co., a Pennsylvania corporation, is a subsidiary of Hardinge Co. Inc., a New York corporation.

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Brown & Gold Machine Co., Cleveland, has changed its name to Brown & Gold Mfg. Co., There has been no change in policy.

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Burdick Mfg. Co., Silver Creek, N. Y., will move to Cambridge Springs, Pa. The company will occupy the plant formerly owned by Hoppenstand Industries.

—o—

Punch-Lok Co., Chicago, has moved its office from 430 North Wolcott street, to 321 North Justine street.

—o—

Johnston & Jennings Co., 864 Addison road, Cleveland, has purchased the exclusive manufacturing and sales rights of Rusta-Restor, a cathodic process for preventing rusting of water tanks, piping and similar steel structures.

—o—

J. H. Williams & Co. will move their Stock Products Sales Offices from 225 Lafayette street, New York, to their plant at Buffalo. A local sales office will be maintained at Lafayette street address to serve the Metropolitan area only.

—o—

Mack Trucks Inc., will move its executive offices from quarters in the company's Long Island City plant into new offices on the 20th floor of the Empire State Building, New York.

—o—

Payroll allotments for regular purchase of War Savings Bonds have been signed by 95 per cent of the more than 4000 employes of **Wickwire Spencer Steel Co.**, New York, E. C. Bowers, president, announces. The Buffalo, N. Y., works, Mt. Wolf, Pa., plant, and New York office of the subsidiary, American Wire Fabrics Corp., each have a 100 per cent record. Plant in Palmer, Mass., reports 95 per cent registration and the Clinton, Mass., plant 94 per cent.

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The Permanente Corp., Permanente, Calif., has changed its name to Permanente Cement Co. to better identify itself with its product.

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E. D. Giberson & Co. Inc., for the past 20 years with warehouses and general offices in building No. 66-67, Bush Terminal, Brooklyn, N. Y., and their executive office at 90 West street, New York, has leased a warehouse at Grand avenue and 57th street, Maspeth, N. Y. Their Brooklyn warehouses have been taken over by the government.

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Palmer-Shile Co., Detroit, has been placed in general charge of all sales of Air-Saver air valves, a product of Briggs & Stratton Corp., Milwaukee.

—o—

The firebrick manufacturing plant of **General Refractories Co.**, Philadelphia, at Troup, Texas, is expected to be in production late this summer. A special type of clay is located near the site of the new plant which will employ 60 persons at the outset.

—o—

Webster Products, engineers and manufacturers of electrical, radio, phonograph, and aircraft equipment, Chicago, has purchased the Armitage plant of Webster-Chicago Corp., Chicago, where it will manufacture dynamotors, generators, inverters, small motors and other equipment.

—o—

United States Steel Supply Co., U. S. Steel subsidiary, announced establishment of a new sales office in Kansas City, Mo. William E. Fry will direct the new office located in the Fidelity bldg., 911 Walnut St.

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Increased demands for marking devices resulted recently in a twofold expansion of **New Method Steel Stamps Inc.**, Detroit. Business volume is ten times as great as it was a decade ago.

—o—

Square D Co., Switch and Panel division, Detroit, announces a complete line of marine lighting panel boards and marine power distribution panel boards, designed to meet government requirements.

—o—

Research laboratories devoted to the study of synthetic rubber have been established at Kent State University, Kent, O., by the **B. F. Goodrich Co.**, Dr. Waldo L. Semon, director of the company's synthetic rubber research, announces. Work is planned for the duration.

PRIORITIES–ALLOCATIONS–PRICES

CMP REGULATIONS

Steel producers, who have received allocation orders to ship controlled materials to other producers for further conversion, are experiencing difficulty in making proper reservations for such tonnage because of lack of information as to specific size range involved. Whenever this situation arises, it is the obligation of the two producers involved to confer and to determine the mill or mills of the supplying producer on which the reservation should be made and such other details as will assist the supplier in properly maintaining the reservation. All producers who purchase controlled materials for further conversion are required to place their purchase orders in accordance with Schedules III and IV of CMP Regulation No. 1, unless otherwise specifically directed. This procedure was outlined by H. G. Batcheller, director, WPB Steel Division.

ACCEPTANCE OF ORDERS: Certain steel producers have been ordered to discontinue the method they have used in accepting orders. These producers in accepting orders for future delivery have failed to estimate and make allowances for the carryover that may result from the acceptance of orders and receipt of directives totaling up to 110% and 105%, respectively, of current production directives or expected production. This carryover, says Mr. Batcheller, is not cumulative and appropriate space to accommodate such carryover must be reserved in mill schedules for the month following the month in which the carryover has accumulated before new orders may be accepted for delivery in that month.

Use by a controlled materials producer of aluminum produced by him constitutes a delivery of controlled material, if the aluminum is converted or processed into any other than a controlled material form or shape. and is subject to provisions relating to such deliveries. This means that such a producer must obtain an allotment of the necessary controlled material.

This procedure is also applicable to the processing of aluminum ingot into sheet, plate, bar, rod, extrusions, and castings or powders; of extrusions in the form of tube looms into tubing; of rod or bar into wire, cable, rolled structural shapes or forgings; of wire into rivets; of sheet or strip into foil; of sheet or plate into forgings, pressings or impact extrusions, and of extruded shapes into forgings.

A producer of aluminum, therefore, may not convert it for his own use beyond the specified forms or shapes, except on an authorized controlled materials order or by specific direction. Before July 1, the use of an order to which a preference rating has been extended is permissible.

APPLICATION FORMS: Form CMPL-150A may be used by all contractors making allotments to sub-contractors producing Class A products, except in case of allotments being made under programs of the Aircraft Resources Control Office. Forms CMPL-200A and 201A provide the instrument with which contractors may increase or decrease allotments to their sub-contractors. Forms CMPL-200 and 201, issued at the same time are for use by Claimant Agencies and Industry Divisions in increasing or decreasing allotments.

The four forms also provide a means for indicating revisions in authorized production schedules. The instructions for use of these forms make it clear that production schedules authorized through their use supersede all previous authorized production schedules for the products involved.

ALLOTMENTS FOR CLASS A PRODUCT PARTS: When manufacturers buy Class A product parts (such as springs, screw machine parts, and stampings) for incorporation in their products and also resell some of them as repair parts, they may, under certain circumstances, make allotments to their suppliers for both.

Under usual procedure, manufacturers of Class A products who sell them for use as MRO supplies, are required to obtain an allotment of materials for their manufacture from the appropriate WPB Industry Division. Such items are handled exactly as though they were Class B products. Application for the allotment should be made on form CMP-4B, except for such items as are directly purchased and programmed by a Claimant Agency.

However, if it is impracticable for the manufacturer of the part to segregate those sold for resale as repair parts from those sold for use as production material, he should obtain an allotment from his customer covering his requirements for the manufacture of both.

SHOE WIRE: Wire used in making footwear is considered an operating supply, even if the wire is not charged to operating expenses on a manufacturer's books. This applies to the following types of wire: Toe lasting, staple, grip tacker, slugging, taper nail, and other types for similar purposes. Shoe wire may be obtained under the uniform procedure which CMP Regulation No. 5 provides for obtaining MRO supplies of controlled materials.

STEEL PIT CASTINGS: Because of the limited facilities for producing and maintaining steel pit castings, it has been found necessary that they should be produced and machined when facilities are available, even though such operations may be in advance of the need for the finished product. The amount of material involved in the production of these castings is relatively small, being estimated at not more than 75,000 tons a year.

L ORDERS

REFRIGERATION AND AIR CONDITIONING MACHINERY: Producers and dealers may deliver maintenance and repair parts to industrial and commercial establishments in accordance with the Controlled Materials Plan. Authorization and preference ratings for machinery assigned on PD-830 or PD-831 may be exteended. The order also requires owner of a repaired system to dispose of replaced parts through regular scrap channels or to the dealer or producer as a condition of his purchase of new parts; eliminates provision prohibiting manufacture of compressors 50 horsepower or larger until receipt of authorized purchase order; prohibits sale of air conditioning and refrigerating equipment of 3 horsepower or larger, except on an authorized order; permits delivery of certain reconditioned or rebuilt parts or assemblies which are defective. (L-38)

DRY CELL BATTERIES: Manufacturers of dry cell batteries, flashlights, lanterns, and other portable electric lights operated by batteries, must submit by the 10th of each month proposed production schedules for the ensuing calendar quarter. Until July 1, the old L-71 quotas will be considered as approved production schedules. (L-71)

RUBBER PROCESSING MACHINERY AND EQUIPMENT: The following actions may be taken now without specific WPB authorization: acquisition of used machinery and equipment by dealers; reconditioning and rebuilding of machinery or equipment, except tire molds, provided cost of materials to be incorporated in any machine does not exceed $350, and alteration in tire molds below the tread line. (L-143-a)

FARM MACHINERY: Copper may now be used in manufacturing starting motors and headlights for farm tractors. Manufacture of certain items of machinery requiring rubber tires is permitted to extent that prior to manufacture of such items specific quantities of rubber tires be made available or released by the WPB for this purpose. (L-170)

OXY-ACETYLENE APPARATUS: Power-driven apparatus and acetylene generators as well as manually operated apparatus is now covered by WPB's order L-268. Hose clamps have been added to list of parts in which use of nonferrous metals or stainless steel is prohibited: prohibition has been exempted on use of nonferrous metals and stainless steel torch handle casings which serve as conveyors of gas as well as electroplating or coating of any of the specified parts. Restriction has been removed on packing certain parts with original equipment but provision that such parts must be sold as separate items with independent sales price is retained. (L-268)

STITCHING OR BOOKBINDING WIRE: Use for commercial binding of certain printed matter has been limited, effective May 25. Producers of printed matter, excepting paper-board containers, matchfolders and tea bags, are forbidden to use any wire stitching in binding printed matter of blank paper numbering 12 pages or less. One stitch or staple is permitted in binding of matter of more than 12 pages but when the bulk of the publication exceeds one half-inch in thickness or exceeds certain minimum dimensions, two staples or stitches are permitted. Publishers of certain bound books, manuals, work books, etc., are limited to 70 per cent of gross quantity of wire used in 1942. (L-291).

RADIO REPLACEMENT PARTS: Requires production under specified standards of dry electrolytic and fixed paper-dielectric condensers and power and audio transformers and reactors after June 30. (L-293)

DENTAL BURS: New order establishing control over production and distribution provides that monthly production and shipping schedules must be filed with WPB by manufacturers and are subject to approval or change by WPB. File schedules on PD-744 by the 15th of each month. (L-295)

AIRCRAFT HARDWARE AND COMPONENTS: Plan for establishment of warehouses to handle aircraft hardware and components to be available in limited quantities for aircraft industry has been announced. A new order provides that limited quantities from producers out of regular production runs will be made available to warehouses. Redistribution of idle and excess stocks of aircraft manufacturers will be facilitated by provisions of the order. (L-296)

CORRECTIVE SPECTACLES: A new schedule (No. 2) prohibits use of any metal except as specified below: Nickel silver (containing not more than 10% nickel) or any copper-base alloy in end pieces, guard arms, and pad inserts, and temples for metal spectacle-ware; and in hinges and rivets for xylonite spectacle ware; nickel silver (containing not more than 18% nickel) in screws and dowels; nickel-silver (containing not more than 10% nickel), copper-zinc alloy or copper in cladding for eye wires, bridges and temples, with certain specified restrictions; nickel, gold, palladium and rhodium for plating of "white-metal" spectacle-ware; brass, silver-indium alloy, and tin-zinc-lead-cadmium alloy in specified parts of rimless spectacle-ware; optical metal (90% copper, 4% zinc, 6% tin) in temple butts; alloy gold (14 carat or less, containing not more than 5% nickel) for any part of spectacle-ware; steel or iron for any part of metal or xylonite spectacle-ware. (L-214)

M ORDERS

CRUDE ABRASIVES AND ABRASIVE GRAIN: Full allocation of these items by the Tools Division has been established. Buyers of manufactured crude abrasive must apply to WPB by June 15 for quantities required in July and August; by Aug. 15 for September and October needs. Corresponding application dates for abrasive grain are June 10 and Aug. 10. Producers and importers of these materials must receive WPB authorization to use them in manufacture of abrasive products. The following amounts may be delivered or used without authorization: $350 list price for abrasive grain made from silicon carbide, $225 for abrasive grain made from aluminum oxide, and $100 for abrasive optical powers made from silicon carbide or aluminum oxide. Small orders for abrasive grain may be delivered after June 1 only on ratings of A-10 or higher on purchase

orders placed before June 1 and on ratings of AA-5 or above for subsequent purchase orders. In general, abrasive grain inventories, other than those of producers or importers, are limited to a 60-day supply for each grain size or type.

PRICE SCHEDULES

MAGNESIUM: Sellers of magnesium or magnesium-alloy ingot manufactured in non-standard shapes and sizes may add premium of one cent a pound to applicable maximum base prices, provided the purchaser has specifically requested the particular shape or size. (No. 314).

BITUMINOUS COAL: Sellers for direct use as bunker fuel must reduce their maximum prices on May 25 by the 6-cent per gross ton increase in the freight rate put into effect March 18, 1942, which was ordered rescinded May 15 by the Interstate Commerce Commission. In the case of bunker fuel shipped to tidewater the ceilings no longer can have the freight rate increase added to them, while in the case of lake shipments the maximum prices which already reflected the March 18 freight increase must be reduced by the same amount. (No. 189)

SOLID FUELS: Producers of miscellaneous solid fuels, other than coke, are granted an adjustment of their maximum prices when it is shown that sale of their entire output at existing maximum prices does not return a realization equal to total costs of production. (No. 121).

COMMODITIES AND SERVICES: Manufacturers may set their prices for new products no sold by them or by competitors during March, 1942, instead of asking OPA to set the price. New pricing formula follows: Maximum price for a product "comparable" to the product to be priced is divided by the direct costs of the comparable product to find the mark-up factor. This factor is multiplied by the direct costs of the product being priced and the result is the maximum price of the new product. (GMPR)

COPPER SULPHATE: Permits distributors to charge retail ceiling prices in retail sales of quantities less than 300 lb. of the commodity when sold for use as an agricultural insecticide or fungicide. Establishes new manufacturers' ceiling price of $9.95 per 100 lb. for quantities of less than 36,000 lb. of monohydrated copper sulphate produced in eastern territory and sold in drums; of $5.20 for copper sulphate crystals produced in western territory and sold in barrels of 400 or 500 lb. in quantities of 15 tons or more. (No. 354).

Appointments-Resignations

A. C. Hoffman, director of the Food Price Division, Office of Price Administration, has been appointed assistant to J. K. Galbraith, deputy administrator for price. Mr. Hoffman will be succeeded in his former post by R. B. Heflebower, dean of the College of Commerce of Washington State College, Pullman, Wash.

* * *

E. W. Palmer has resigned as deputy director of the Printing and Publishing Division, War Production Board. Mr. Palmer has been commissioned an officer in the Adjutant General's office where he will supervise the printing of instruction manuals for the Army ground forces.

* * *

Donald J. Sterling has resigned as Donald M. Nelson's consultant on the newspaper and publishing industries. He is returning to his post as managing editor of the Oregon Journal, Portland, Oreg.

Standardized Methods Adopted for Component Scheduling Procedure

PROCEDURES for thoroughly scheduling delivery of bottleneck components of planes, tanks, guns and ships have been announced by the Production Scheduling Division of the WPB Production Controls Bureau.

These component scheduling procedures, effective June 1, consist of the following steps: (1) Claimant agencies will program their requirements and spell them out across the calendar; (2) WPB will evaluate these requirements before they are put into process to see that they are within industry's capacity and to see that orders are uniformly distributed; (3) manufacturers are given positive identification of the programs into which their products are going and are given realistic delivery requirements in harmony with the production schedule of the procurement item or construction schedule of a new plant; (4) when the situation indicates it, one manufacturer is asked to pass this information on to another, so that a clear train of identification will be blazed to the original procurement item and so that realistic delivery schedules will be established at each contracting level; (5) manufacturers are asked to review their production schedules and to make firm promises of delivery against the requirements that have been placed on them, and, whenever a program threatens to be held back by a bottleneck item, WPB will be notified at once to the end that either the bottleneck will be broken or the program will be re-adjusted to this limiting factor.

The need for more thorough scheduling of critical common components has been recognized for many months, but the problem has presented some of the most difficult technical barriers the war administration has been required to overcome. Several hundred leading manufacturers of war products are now carefully scheduling their operations, but many others are unfamiliar with this type of procedure; and until new patterns of operations were established and the advantages demonstrated many were not convinced of the usefulness of the practice.

Schedule forms and instructions are being distributed to components manufacturers. Critical items in the following programs and projects will be covered: ships of all sizes and types; tanks, combat vehicles and motor transport vehicles as programmed by the War Department; power generating plants as programmed by the Office of War Utilities; and plants designed for the production of rubber, high-octane gasoline, aluminum, magnesium and steel.

Initially the procedures will apply to a limited number of items when purchased on new orders directly from the manufacturer by the prime contractors or claimant agency, who is building the project or the programmed product into which the components go. The control components will be: turbines and turbo-generators, motor generator sets, internal combustion engines, boilers, compressors and dry vacuum pumps, turbo-blowers and exhausters, steam condensers, heat exchangers, pressure vessels, fans and blowers, switch gear, pumps, stokers, pulverizers and transformers.

In addition, the following sub-components will be brought into the scheduling effort: crankshafts, fuel injectors, magnetos, reduction gears, electric motors, electric motor controls, and generators, or any of the components in the preceding list when purchased by a person other than a prime contractor or claimant agency.

General responsibility for the effort will be that of Harold Boeschenstein, director, WPB Production Control Bureau. Harry Zellman, director of the Production Scheduling Division will supervise the operation directly. Deputy director of this Division is William Passano.

Mr. Zellman and Mr. Passano say that application of the scheduling procedure will be flexible.

Special Prices Offered For Idle Aluminum Stocks

Special prices for purchase of idle inventories of aluminum which are reported before June 30, was announced last week by the War Production Board. These prices apply to idle inventories which cannot be redistributed in their present form and which are needed for remelting.

Any materials reported after that date and which cannot be redistributed in their present form must be disposed of as scrap, since the special prices will be withdrawn after June 30.

The special price drive for idle inventories is being undertaken because additional supplies of aluminum are required immediately for war purposes. Owners of idle inventories have been asked to file a copy of form WPB-667 revised with WPB, care of Murray Cook, agent for Metals Reserve Co., 155 East Forty-fourth street, New York.

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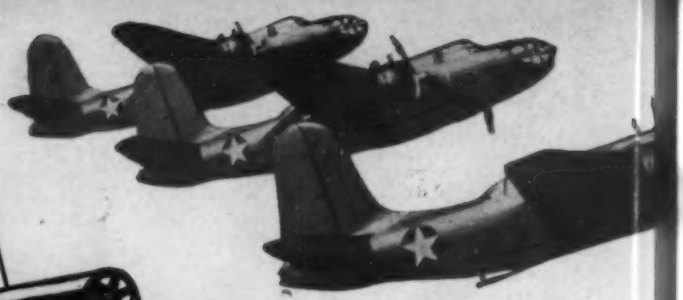

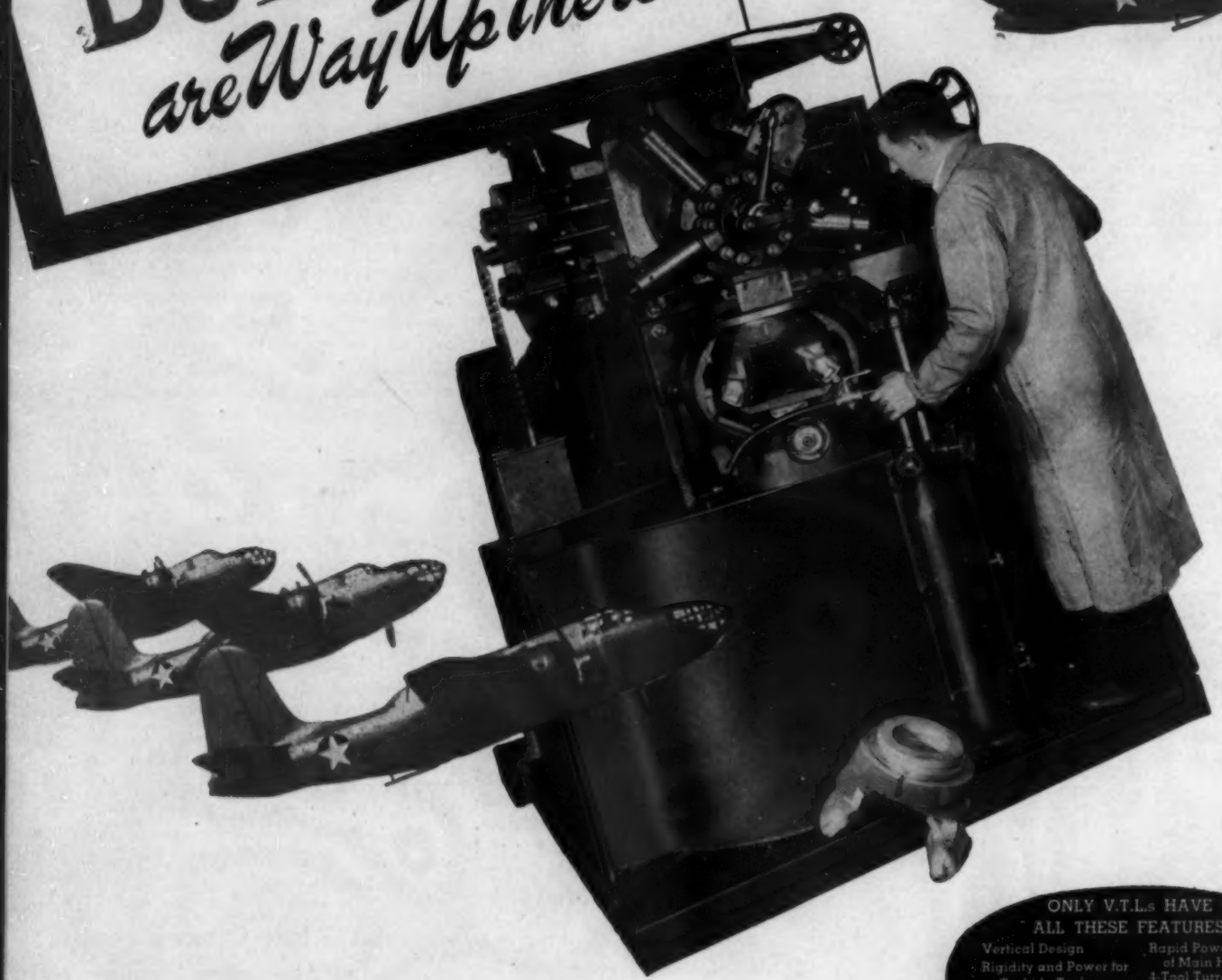

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America is now rapidly overhauling the Axis in the air. Credit America's productive genius for the amazing speed with which, in one short year, old plants and new have turned out the bombers, the fighters, the transports we need.

Credit too, for a vital share in the achievement, the speedy and accurate Bullard Vertical Turret Lathe. *The greatest single reason we are making 6 times as many V.T.L.s today as in 1940 is the vastly increased demand for them by the airplane engine makers.*

When the war is won, these V.T.L.s will have plenty to do. It will take little time to retool them for the works of peace . . . for in *versatility* too, the V.T.L. is *way up there.*

Airplane photos, U.S. Navy Air Corps.

We like to feel that our Army-Navy "E" award is for work that is helping our customers to earn their "E" too.

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Fair volume of key machine tools will be needed to reconvert automotive industry. . . Ernest C. Kanzler reported studying postwar problems. . . Return to normal manufacturing will cause cost sheets to assume customary importance

DESPITE K. T. Keller's pungent statement to the effect the only postwar planning Chrysler Corp. was doing was to figure out how it could help to "get the damn war over with" in the quickest possible way, there are plenty of indications that down the line from the top ranks of management there is considerable planning on what steps must be taken to insure a speedy resumption of automobile manufacture once it becomes feasible. At least such is true in the case of one large producer and, with this the situation, the other motor companies must be busying themselves along the same lines, for the industry was never one to let a competitor get the jump on his rival over the fence.

Off the record, the heads of two principal builders have "guessed" that their manufacturing plants would be building new automobiles by the spring of next year in one case and by the fall of 1944 in the other. Their estimates of the time interval between approval by the government to resume production and the appearance of the first new car range from four to eight months.

Will Need Machine Tools

Machine tool builders, now witnessing their war plant equipment orders easing off appreciably and biting their nails over the prospect of a postwar industry fully equipped with more than enough of the finest machinery ever built, can take some consolation from the fact the motor industry is going to need a fair volume of "key" machinery items in a hurry once the plans for resuming passenger cars get the green light. The reason is that much essential automobile equipment has been torn out of plants and either loaned, given or sold to other plants which could use it, or plumped out in the storage yard and forgotten.

This sidetracked equipment will never be returned to the motor plants, you can be sure. Just what the specific items necessary to reconversion are the plant men will not say, for the very good reason that they know there is going to be a rush to the machinery builders when the time comes, and they are getting set.

All the machinery people have to do is to figure out just what equipment the motor companies are going to be rushing out to buy, and their immediate postwar future may not be as black as some of them now envisage.

It should be emphasized that such discussion of reconversion activity is generally way off the record and there is no diminution of pressure on war production. Certainly no military realist can figure out a plausible finish to the war by the end of this year or even by next summer. So the talk of 1944 and 1945 passenger car models probably will have to be written off as just a hunch.

The hunch is not just a phenomenon exhibited by the brains of auto executives. It is heard around Detroit that Ernest C. Kanzler, former director general of operations for the WPB, has recovered from his "Washington stomach" which forced his retirement from the WPB and is now sequestered in a capitol office, unadvertised and sending out no publicity releases, where he is digging into the problem of reconversion of industry to peacetime production, at the behest of Donald M. Nelson. If the report is true—and there is as yet nothing official about the news—then it should be a welcome development for industry, for Kanzler did a whale of a job while he was on the scene, and can be reckoned as a realist and not a parlor planner when it comes to postwar industry.

One thing sure about the reconversion of industry to normal manufacturing is the fact that cost sheets will once more assume their customary importance. As the visitor to war plants these days roams through some of the facilities busy on fabricating and machining parts and subassemblies for the engines of war the impression is gained and constantly re-emphasized that much of the current use and treatment of materials is tremendously wasteful and inefficient. Methods are in force which could not survive a week of normal manufacturing, but they remain in force because they are specified that way by the arsenals or are specified that way by the arsenals.

To a certain extent the industry has been accorded a welcome hand in the suggestion of alternate methods and substitute materials, but there is still a woeful waste which would probably take ten years of war production to squeeze out. Naturally there are logical explanations. The matter of safety and dependability in an aircraft engine versus an automobile engine is not at all comparable. Industry in general has had practically no time-tested experience in manufacturing armament. Changes take time to work out, and speed is of the essence. Redesigns are unending and provisions must be made to accommodate them.

For example, take a hypothetical small bushing for an airplane engine which is

INSPECTING AIRCRAFT PISTONS AT HUDSON

JEWEL-LIKE stream of glistening aluminum pistons for Wright Cyclone aircraft engines is only a small part of the day's production undergoing final inspection at one of Hudson Motor Car Co.'s Detroit plants. To be accepted, the finish cannot show roughness of over ten micro-inches and the weight of each piston must be held to limits within 0.04-pound. From here the pistons go to a shipping room where they are individually wrapped and packed

laboriously turned, bored and literally dug out of a piece of round bar stock, when conceivably it might be turned out at a fraction of the cost from a piece of upset tubing. The trouble is that in the latter case you would have to build upsetter dies and tube rolling dies and by that time a redesign might make all these expensive dies obsolete, whereas if it is chewed out of solid stock a redesign can be taken in stride, perhaps by only a slight shift in cutting tools or machining procedure.

It is nonetheless disturbing to old-line production men in the motor plants to witness some of the "crude" methods which they must follow today. They say, in substance, "If we ever had to build an automobile that way, it's a cinch there would be few people driving cars."

Considerable mystery surrounds the sudden cancellation or "postponement" of dedication ceremonies scheduled ten days ago at the Liquid Cooled Engine Division of the Aviation Corp. at Toledo, O. Invitations had been sent out for a preview of the plant where manufacture was reported under way on "liquid cooled airplane engines for the U. S. Navy and Army with horsepower rating greater than those of other liquid cooled engines now in production for aircraft." A week before the flag-raising, the affair was called off and it is understood in Detroit that WPB has ordered all work at the plant stopped.

Number of Possible Explanations

Possible explanations are these: 1. The engine has not proved sound (a remote if not absurd possibility in view of the extensive preliminary work done on it); 2. No airplane yet beyond the design stage in which an engine of this high horsepower could be used; 3. Lack of some essential equipment in the plant facilities; 4. Decision by the WPB and the armed services to stop work on all projects not yet in production, to be followed by a detailed review of each to determine its essentiality.

On the other side of the picture, however, is the announcement of a new plant to be built in Scranton, Pa., to be operated by Murray Corp. of America here for bomber and fighter plane wing assembly operations. While Murray officials can say nothing about the plant in detail, the *Scranton Tribune* recently carried what purported to be a summary of the project, indicating the plant will cover about 500,000 square feet, measure 1400 by 350 feet, 20-40 feet high, employ around 7000. Foundations were started May 5 and construction will be of brick and steel.

Selection of Scranton is understood to have been based on surveys showing this city was one of the few in the country which have not been inundated by war production, with some 30,000 unemployed and 7000 vacant houses.

Paternity of the Army's jeep was thrown open to public scrutiny recently, following the filing of a complaint by the Federal Trade Commission against Willys-Overland Motors in Toledo, and others. The commission alleges that Willys took credit in advertisements for creating and perfecting the jeep in collaboration with the Army Quartermaster Corps, whereas the vehicle was originated by the American Bantam Car Co., Butler, Pa., in collaboration with certain officers of the U. S. Army.

This was an amusing development to those in Detroit who have been familiar with the circuitous path of the jeep from drawing board to production line, and the denouement of the FTC complaint may have some interesting repercussions. At any rate, the commission has been a long time in recognizing that the "power of the pen is mightier than the sword"—or the sliderule, to get more to the point.

It is more than a society note to call attention to the fact that a group of Chrysler engineers has been at work for several weeks in the Tuttle & Clark department store building in downtown Detroit, now closed and taken over by Chrysler. The nature of their work is a closely guarded secret and corporation officials have nothing to say about it. One report is to the effect the engineers are doing drafting work for the Dodge Chicago engine plant, but the odds against this being true are about 100 to 1.

By turning to centrifugal casting of alloy steel to replace forgings for airplane engine cylinder barrels, Ford engineers estimate they have effected a saving of 17,500 pounds of metal for every 500 barrels, and at the same time require foundry equipment costing only $34,700, against forging presses costing $134,000.

Perfecting the centrifugal casting process for the barrels was nothing compared with the job of getting approval from the Air Forces and from Pratt & Whitney, whose engine Ford is building, but Ford spokesmen now state that authorization has been granted to use the cast barrels on all P & W engines built at the Rouge plant.

Ford has had extensive experience with centrifugal casting of steel, under the active direction of R. H. McCarroll, metallurgist. Equipment for casting the barrels is similar to that used previously on such parts as cluster gears. Molds are mounted on a turntable, eight to the unit. Two stations are used for loading and unloading, one for spraying the mold, one for pouring, the balance of the time for cooling. Cycle of the table is about 3½ minutes per revolution. Molds are hooded and are spun at 750 r.p.m.

Testing Military Vehicles

Studebaker proving grounds, 12 miles west of South Bend, will be utilized for the testing of standard combat armored cars, half-tracs, heavy tractors, cargo carriers and other army vehicles as a result of contract recently signed by the company with the Chicago Ordnance District, under which Studebaker engineering staff will conduct operations for ordnance starting by early summer. Proof testing of army vehicles is of course not new, the Studebaker facilities merely being enlisted to extend present activity in this sphere.

Fisher Body Division reports its subcontractors and suppliers now number 4200, or over four times the number normally required in peacetime. The list covers 30 states from coast to coast and from Minnesota to Texas. Fisher Body, in turn, is a subcontractor to other companies on 20 war production items. Virtually every type of manufacturing company has been tapped as a possible source. One company which formerly made neon signs now supplies hand grenades for tanks, a thermos bottle manufacturer supplies an aircraft instrument part, an electric motor builder furnishes insulation for firing pins, etc.

POSTWAR ADVISORS

Committee for Economic Development, of which Paul G. Hoffman, president, Studebaker Corp., is chairman, has named a committee of 10 Pittsburgh industrialists to act as advisors to deal with postwar industrial problems in the western Pennsylvania area. H. S. Wherrett, vice president of the board, Pittsburgh Plate Glass Co., has been named chairman of the Pittsburgh district committee.

Members include: J. D. Berg, chairman of the board, Dravo Corp.; George H. Bucher, president, Westinghouse Electric & Mfg. Co.; J. Frank Drake, president, Gulf Oil Corp.; B. F. Fairless, president, United States Steel Corp.; H. J. Heinz, II, president, H. J. Heinz Co.; Roy A. Hunt, president, Aluminum Co. of America; Gwilym A. Price, president, Peoples-Pittsburgh Trust Co.; Clarence Stanley, Union Trust Co. of Pittsburgh; J. T. Tierney, chairman of the board, Koppers Co.; and W. P. Witherow, Blaw-Knox Co.

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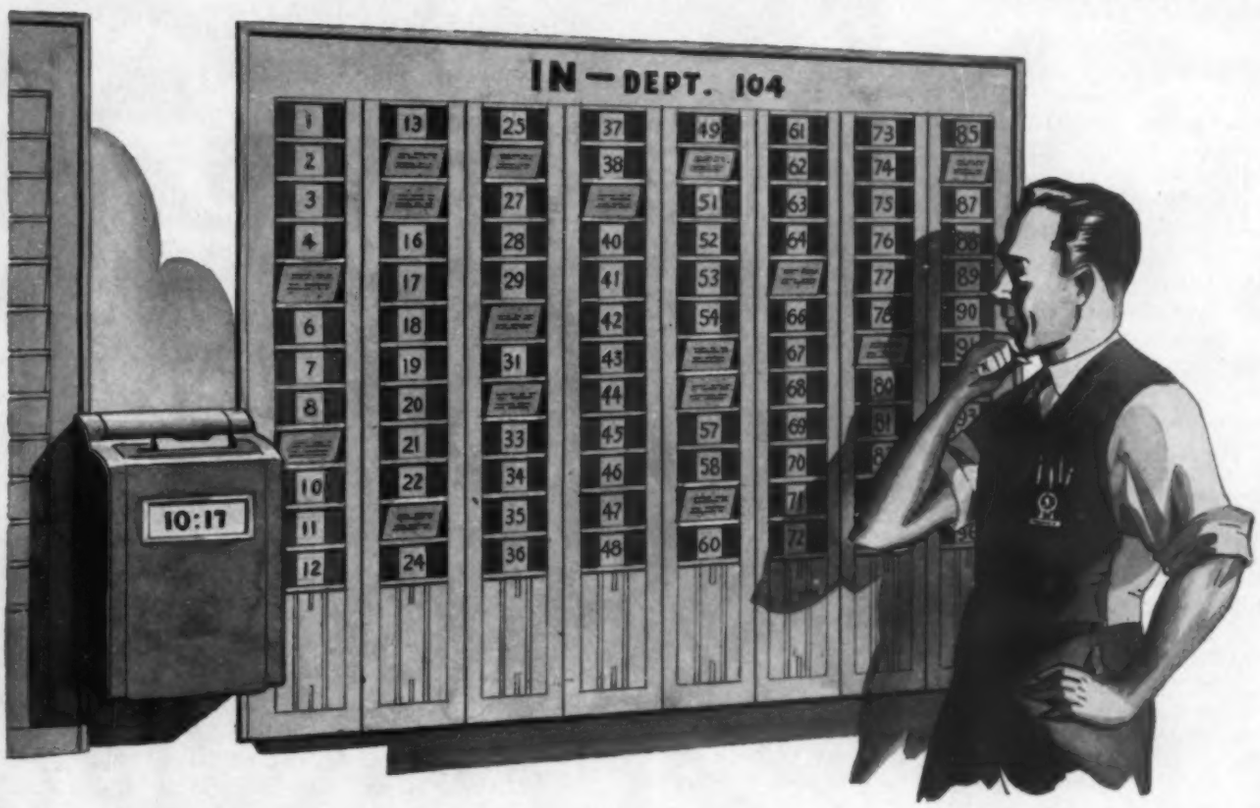
A Vickers Application Engineer will gladly discuss "hydraulics" in connection with your machines.



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"Produce and Attack!"

War Production Board executive gives convention slogan for future with defensive phases of war over. . . More and drastic sacrifices necessary. . . Consider postwar problems

By GUY HUBBARD
Machine Tool Editor

KEYNOTE of the national war effort, as it is to be from now on, was sounded by R. C. Sollenberger, deputy chief, Material Handling Equipment Section, War Production Board, speaking at the opening session of the 27th annual meeting of the American Gear Manufacturers' Association at Westchester Country Club, Rye, N. Y., on May 17. "The defensive phases of the war are over, so far as the United Nations are concerned," said Mr. Sollenberger. "From now on, our slogan is, 'Produce and Attack'!"

This means further and more drastic sacrifices on the part of the civilian population, he warned. With vast resources of strategic materials still controlled by the Axis powers, it is vitally necessary that under the new controlled material plan, every bit of the material which we do have shall be delivered in the right quantity, of the right quality, in the right place, at the right time. That is true particularly in the gear industry, the precision products of which play a tremendously important role in war mechanisms ranging all the way from delicate instruments to battleship drives.

"Not Way To Win the War"

As guest speaker at one of the later sessions, Tell Berna, general manager, National Machine Tool Builders' Association, drew several important conclusions from his long and intimate experience as the representative of a key industry, coping with and co-operating with Washington bureaucrats and bureaus. "It may be fun at times to fight with Washington," said Mr. Berna, "but that—gentlemen—is not the way to fight this war!"

For example, he added, demands for data often are irksome, but in this realm of statistics, industry must unearth the true facts, or be the victim of other peoples' imaginations. Therefore, Mr. Berna urged that members of trade associations have confidence in the ability of the statistical divisions of these organizations to protect the intimate data which must be furnished to them if the resulting statistics are to be worth the paper they are written on.

As has been the case with many conventions of industrial organizations recently, this meeting of the gear manufacturers featured some speakers who dealt with postwar problems and post-war planning. One of these was Dr. Ruth Alexander, economist and author, who was the guest speaker at the annual dinner on Tuesday evening, May 18.

CONNELL MEDAL

On the basis of her investigations of the economic and political principles of Marxism and Fascism, Dr. Alexander has been moved to go up and down this country urging the restoration of economics to its original function of a guide to intelligent statesmanship and a means for clarifying the connection between economic ideas and political realities.

As the result of her recent travels, Dr. Alexander is convinced that "the postwar America that Americans do not want," is that in which freedom will have been surrendered for something presented—and misrepresented—as "security". That is what happened in many other countries.

Awarded Connell Medal

The climax of the annual dinner was the presentation to Aubrey A. Ross of the association's Edward P. Connell award, together with life membership in AGMA. Mr. Ross, who recently retired from the General Electric Co. after 48 years of service, played a leading role in the development of that company's geared drives for marine propulsion. He has been influential in AGMA affairs since the early days of the organization and was its president in 1935-36.

This award, established by the Falk Corp. as a memorial to the late Edward P. Connell, onetime vice president of that company, is made by AGMA in recognition of individual contributions to "the gear industry, the gearing arts or to the association." In this instance the presentation speech was made by E. W. Miller, general manager, Fellows Gear Shaper Co., a long-time friend of Mr. Ross who was introduced by retiring president John Flagg as "the sage from Vermont."

AUBREY A. ROSS

Discusses Fatigue Failures

A number of engineering papers of outstanding merit were presented at this AGMA meeting. One of these was by J. O. Almen, research laboratories division, General Motors Corp. His subject was, "Improving the Fatigue Strength of Machine Parts." Mr. Almen took as his thesis this statement: "Fatigue failures result only from tension stresses, never from compressive stresses, and any surface—no matter how smoothly finished—is a stress raiser."

To emphasize this point regarding the surface effect, Mr. Almen showed a remarkable series of slides demonstrating how surface-finishing methods leave their indelible impress in metal surfaces. A specimen which originally was machined with a conventional single-point tool, was lapped to remove all surface indications of tool marks. Upon being shot-blasted the tool marks reappeared on this lapped surface, indicating that machining actually disturbs the structure of metal below the surface, thus creating hidden invisible stress raisers.

Mr. Almen's conclusion, based on extensive experimentation, is that the fatigue strength even of the most carefully machined part can be increased if a thin layer on its surface is pre-stressed in compression. This can be done by peen hammering, swaging, shot blasting, tumbling or by pressure operations by

balls or rollers, under careful control.

"The study of fatigue of materials," said Mr. Almen, "properly is the joint duty of the metallurgical, engineering and production departments. Unless all of these departments have an understanding of fatigue phenomena and the factors that promote fatigue, they cannot recognize their individual responsibilities for the product they manufacture.

"There is no definite line of demarkation between mechanical and metallurgical factors that contribute to fatigue. Therefore, there must be very close cooperation between the metallurgical and the engineering fatigue specialists, if there be both, or in any other case the metallurgist must possess the combined qualifications of metallurgist, designer and machinist.

"This overlapping of responsibility is not sufficiently understood in industry. Hence engineers constantly are demanding new metallurgical miracles instead of correcting their own faults. It would be very helpful if metallurgists would be less willing to look for metallurgical causes of fatigue and insist that equally competent examination be made for mechanical causes. Until this is done, we cannot hope to make full use of our engineering materials."

Induction Hardening of Gears

Frank W. Curtis, chief engineer, Van Norman Machine Tool Co., by means of a talk and a colored motion picture, dealt with induction hardening of gears.

According to Mr. Curtis' views, high-frequency induction hardening is going to have considerable effect on the types of steels used for gears. He pointed out that SAE-1045 steel has good qualifications for induction-hardened gears, surface hardness up to 60 rockwell C readily being attained. Another grade with which he has had considerable success is X-1340. He mentioned that 0.45 to 0.50 carbon steels having core strength as high as 100,000 pounds per square inch are now available and lend themselves extremely well to the induction treatment.

"When gears are hardened by high-frequency generated heat," said Mr. Curtis, "the heat pattern will vary somewhat, depending upon the size of the tooth. With gears having small teeth—say about 20 pitch—the entire tooth is heated. With slightly larger teeth—such as 12 pitch—the heat pattern begins to follow the contour of the teeth. On gears of 8 to 10 pitch, the heat pattern very definitely follows tooth contour and very uniform case hardening takes place.

"When teeth are larger—4 pitch on down—it becomes difficult to 'throw' heat down into the roots. Result is that the upper portions of the teeth become highly heated before the heat gets down into the body of the gear. That causes the heat pattern to resemble that obtained in the case of fine pitch gears. From this it will be seen that the ideal condition prevails when gears are of 8 to 10 pitch, while fairly favorable conditions exist when teeth are of 12 or 14 pitch."

At the closing session of the convention, held Wednesday morning, May 19, Russell C. Ball, the new president of the association presided. On this occasion Granger Davenport, assistant chief engineer, Gould & Eberhardt, Inc., presented an interesting paper based on his experience as chairman of the transportation committee of his company.

The gist of Mr. Davenport's "share-the-car" transportation plan for getting employes to and from work with minimum expenditure of tires and gasoline, is that it operates on a directional basis instead of the usual rectangular zone system. With the plant as a center, a map has been laid out with segments bounded by north, northeast, east, southeast, south, southwest and west compass radii. Each employe is classified by shift, compass direction of his home from the plant, and approximate straight line distance (to nearest mile) from his home to the plant.

An important feature of this plan is the bulletin board listing of employe names with clock and department numbers. They are grouped according to shift and under each shift are nine columns. First column is headed "O", indicating "walking distance." Second column is headed "N," representing northerly direction. The first group of names under "N" is labeled "N1," indicating approximately one mile distant. The second group *in the same column* is labeled "N2"—two miles distant, and so on. Next column is "NE," the next "E" and thus "around the circle."

The advantage of this system now becomes obvious. Any employe wishing to find riders or other car drivers living near him, simply looks for his name on the bulletin board under his shift and in the proper column. He may find himself, for example, under "7 shift" (that is seven-to-seven) with classification "E6." All his neighbors living in a generally easterly direction and approximately six miles from the plant at once become known to him—all being listed in the same group.

However, if there is no one in the group except himself, he will glance on down the list under "E7," "E8," "E9," etc., to see if anyone lives further away in his same direction. Assuming that there is no one in that category, he then looks under "E5," "E4," "E3," etc., to see if someone living nearer the plant can take him part way home, or—if he drives—whether he can pick up some such individual himself.

If he still fails to fit into the scheme of things, he then examines the columns to right and left of this "E" column. There he probably will find someone from further away and in slightly different direction who will be willing to go slightly out of the way in order to pick him up.

Tool Builders Going Right Ahead

"We will go right on working just as hard as we can building machine tools on our war order boards—until these orders are canceled!"

This forthright statement, by Tell Berna, general manager, National Machine Tool Builders' Association, at the annual meeting of the American Gear Manufacturers Association, clears the air of a lot of rumors and misapprehension regarding the immediate future of one of the fundamental industries in the war effort.

Inquiry among machine tool companies indicates recent Washington statements to the effect the machine tool builders' job "as such" is finished as far as the war is concerned, and that the industry generally will be converted to direct manufacture of war materiel, are having a decidedly unhealthy effect on morale in the industry.

Undoubtedly it is true that—through the almost superhuman efforts of the machine tool builders—America is "over the hump" as far as the war tooling program is concerned. At least that may be true of certain important parts of the war program. In other words, at the moment it looks as though there is—or soon will be—a fairly safe sufficiency of certain basic machine tools which originally were dangerously scarce.

However, there are many machines for which there continues a crying need, not only in this country but abroad. Then, too, sudden changes in the war make future requirements entirely unpredictable. Emphasis is liable to shift overnight—creating serious, unexpected tool shortages.

As Mr. Berna aptly put it, "No other war materiel should be allowed to get in the way of production of any machine tools which still are needed in the war effort!"

MEN of INDUSTRY

DR. WILLARD H. DOW

A. S. THAELER

ROBERT G. BLOOM

GEO. E. WHITLOCK

Willard H. Dow, president, Dow Chemical Co., Midland, Mich., has been presented the Charles Frederick Chandler Medal for distinguished achievement in chemistry. Mr. Dow was chosen "for his dynamic and successful leadership in the American chemical industry" and for his "daring enterprise in the direction of the extraction of bromine and of magnesium from sea water," and the production of synthetic plastics and synthetic rubber. The medal is awarded annually from a special fund administered by the trustees of Columbia University.

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Charles R. Hook and **Elisha Walker** have been elected to the Board of Directors, Westinghouse Electric & Mfg. Co., Pittsburgh, and **James H. Purves,** has been elected assistant treasurer and assistant secretary, a newly created position. Mr. Hook is president, American Rolling Mill Co., and Mr. Walker, a partner of Kuhn, Loeb & Co., New York. Mr. Purves, investment manager and administrator of the company's paymasters and bank deposits, will continue in that capacity. **Charles A. Conklin,** formerly manager, southeastern district, has been made central district manager, lamp division, to succeed Frank C. Barrington, who is retiring after 31 years of service with Westinghouse. Others recently appointed by Westinghouse are: Frederick S. Rowe, manager, electronic tube production and stocks, and William J. Knochel, assistant superintendent of electronics manufacturing.

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J. Y. Dahlstrand has been named vice president of Universal Gear Corp., Indianapolis, and **Chas. H. Amy** has been made treasurer. Mr. Dahlstrand, who for the past five years has been chief engineer and director of sales of the corporation, was previously connected with the Murray Iron Works Co., Burlington, Iowa, Allis Chalmers Mfg. Co., Milwaukee, and Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Mr. Amy formerly conducted his own practice.

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A. S. Thaeler has been appointed assistant chief engineer, United States Steel Corp.'s Federal Shipbuilding & Dry Dock Co., Kearny, N. J., to succeed Charles H. Johnson who has been granted a leave of absence to serve the United States Maritime Commission.

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Howard Handyside, formerly office manager of American Society of Tool Engineers, Detroit, has been appointed to the tool engineering department, Ford Motor Co.

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William C. Heath, president, A. O. Smith Corp., Milwaukee, has been elected a class B director, Federal Reserve Bank of Chicago, to fill the unexpired term of the late **Max W. Babb,** chairman, Allis-Chalmers Mfg. Co., Milwaukee.

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E. T. Parks, assistant general freight agent, Chicago, Burlington & Quincy railroad, has been named general agent with headquarters in Chicago. **W. C. Radell,** assistant general freight agent, Chicago, has been transferred to Omaha to succeed Mr. Parks.

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Curtis A. Gordon, formerly of Rustless Iron & Steel Corp., Baltimore, has been appointed superintendent of the rolling mill, Wickwire Spencer Steel Co., Buffalo, to succeed A. J. Wheeldon, who retired after 26 years service with the company.

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O. J. Neslage has been appointed general sales manager and **J. N. Rolston** assistant general sales manager, Sullivan Machinery Co., Michigan City, Ind. Mr. Neslage has served as manager of the company's Mexico City, Joplin, Salt Lake City and New York territories. Assistant general manager of the company's Canadian subsidiary for 5 years. Mr. Rolston has been with the Sullivan company for 13 years.

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Robert G. Bloom has been appointed controller of Lukens Steel Co., Coatesville, Pa., succeeding **William J. Bassett** who has retired. Mr. Bloom who has been with the company since 1927 will be in charge of accounting for Lukens and the coordination of such activities in its subsidiary companies, By-Products Steel Corp. and Lukenweld Inc.

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George E. Whitlock, president, Mullins Mfg. Corp., Warren, O., has been elected president of the newly-organized Pressed Metal Institute of New York and Washington; **S. J. Menzel** of Motors Metal Mfg. Co., Detroit, vice president and **H. L. Moody** of Stevenson, Jordan & Harrison, New York, secretary-treasurer and managing director. Board of trustees are: **Frank E. Graper,** Acklin Stamping Co., Toledo, O.; **W. W. Galbreath,** Alliance Porcelain Products Co., Alliance, O.; **J. H. Robins,** American Pulley Co., Philadelphia; **G. F. Ahlbrandt,** American Rolling Mill Co., Middletown, O.; **William H. Miller,** Bossert Co. Inc., Utica, N. Y. and **W. E. Porter,** A. S. Campbell Co. Inc., East Boston, Mass.

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George O. Hultgren, district freight agent, Pennsylvania railroad, Chicago, has been appointed special representative at South Bend, Ind. He has been associated with the road since 1900.

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Gordon W. Cameron has been elected treasurer, Aluminum Co. of America, to

succeed **R. E. Withers** who will retire from that post Sept. 15, 1943, but who will continue as senior vice president in charge of finance. Mr. Cameron, at present manager of the Aluminum company's Boston office, is serving as coordinator of construction of new plants.

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E. S. McConnell, formerly with Edison Electric Institute, has been appointed product manager for aeronautical wires and cables, United States Rubber Co., New York.

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George L. Altman has been appointed to take complete charge of purchasing, Maysteel Products Co. Inc., Mayville, Wis.

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E. D. Bransone, president of Vanadium Corp. of America, New York, has been elected a director of Mack Trucks Inc., succeeding **Harry W. Croft,** recently resigned.

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J. M. McLeod, formerly assistant sales manager, Hardinge Bros. Inc., Elmira, N. Y., has become associated with Ray H. Morris as district manager of the company's Hartford office.

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A. H. Roosma, for past eight years chief industrial engineer, Republic Steel Corp., Cleveland, has been appointed assistant manager, southern district. Prior to his association with Republic in 1930, Mr. Roosma was with Jones & Laughlin Steel Corp., Pittsburgh, and Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. He will be succeeded by **E. M. Kropp,** formerly assistant chief industrial engineer. **Peter Robertson,** assistant chief industrial engineer with supervision over the manufacturing division, will assume direct supervision over the steel plants as well. **J. H. Graft,** assistant district manager, Youngstown district; **E. A. Schwartz,** chairman of Republic's open hearth committee and **M. D. Wald,** superintendent of blast furnaces and coke works, Cleveland district, have been made assistant district managers of the Buffalo, Youngstown and Warren districts, respectively.

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C. E. Jarchow, comptroller, International Harvester Co. since April, 1936, has been elected vice president and will bear the title of vice president and comptroller. Prior to joining the company 29 years ago, Mr. Jarchow was employed by American Steel Foundries, Chicago.

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W. A. Hauck has been named chief, control section, Iron and Steel Section, WPB, to succeed **E. R. Resler** who has resigned. At one time chief of the Iron and Steel Expansion Program division, Mr. Hauck came to WPB early in its organization. Mr. Resler was assistant comptroller of Jones & Laughlin Steel Corp., Pittsburgh, before he became associated with WPB less than a year ago.

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Henry Dressel has been made supervisor of electronic components engineering, Stackpole Car Co., St. Marys, Pa. Mr. Dressel has been with the company several years.

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L. W. Long has been appointed sales engineer in charge of mixed apparatus sales in the electrical department of Allis-Chalmers Mfg. Co., Milwaukee. Mr. Long joined Allis-Chalmers in 1925 and until recently has served as sales engineer at the company's Pittsburgh office.

LEIGH WILLARD

Who has been elected a director of Allis-Chalmers Mfg. Co., Milwaukee, as announced in STEEL, May 17, p. 85. Mr. Leigh is also president and a director of Interlake Iron Corp., Chicago.

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Jay J. Risman, Morrison & Risman Co. Inc., Buffalo, N. Y., has been elected president of the Western New York chapter, Institute of Scrap Iron & Steel Inc., succeeding **Max Pressler. Nathan H. Jacobs,** Buffalo House Wrecking & Salvage Co., Buffalo, has been elected vice president; **Leo Chapin,** Chapin & Fagin Inc., Buffalo, becomes secretary-treasurer.

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Paul Schieve, president of the Schieve Construction Co., Buffalo, has been elected president of the Buffalo Structural Steel Corp., to succeed **John P. Maddigan** who resigned recently.

OBITUARIES . . .

Edsel Ford, 49, president, Ford Motor Co., Detroit, died May 26 at Grosse Pointe Shores, Mich.

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Brig. Gen. Lyman Parsons Hubbell, 68, former president, Fillmore Avenue Foundry & Iron Works Inc., Buffalo, died May 21 in that city.

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Stanley Keleske, 45, acting president, Wisconsin Screw Co., Racine, Wis., and associated with R. & M. Mfg. Co., West Allis, Wis., died May 23 in Milwaukee.

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Frederick P. Harris, 66, first and only purchasing agent of General Electric Co.'s Nela Park plant in East Cleveland, died May 23 at Mentor Headlands, O.

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Mark Henry Damerell, 77, designer, forging expert and consulting engineer, Wyman-Gordon Co., Worcester, Mass., died May 16. Mr. Damerell recently designed a hydraulically controlled extruding press for airplane spider, built under his supervision by A. B. Farquhar Co. Inc., York, Pa.

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Frank H. Smith, 77, who retired in 1936 as western division manager in Chicago, Magnus Co. Inc., now Magnus Metal Corp., died May 22 in Sarasota, Fla. He had been associated with the company 50 years.

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Herbert R. Owen, vice president, Landers, Frary & Clark Co., New York, died May 22 at New Rochelle, N. Y.

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John F. Glaser, 62, superintendent, Norlipp Co., Chicago, died May 10 in Evanston, Ill.

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Adna W. Gibson, 49, in charge of lubricating oil department of Standard Vacuum Oil Co.'s South China division at Hong-kong until Japan went to war against the United States, died May 18 at Rochester, N. Y.

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Dana Ripley Bullen, 78, assistant to the vice president, General Electric Co., Schenectady, N. Y., until his retirement ten years ago, died recently.

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Harry F. Plagenz, vice president and treasurer, Cuyahoga Spring Co., Cleveland, died May 21 in that city.

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Frederic McCleery, 46, purchasing agent, Sharon Steel Corp., Sharon, Pa., died recently in that city.

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Frederick Krick, 46, superintendent for past ten years, Cleveland division, Pennsylvania railroad, died in Cleveland May 21.

Incentive as Key to Production Increase Hailed at Convention

Viewed by speaker as great motivating force in making productive capacity "arsenal for the Allies" and raising standard of living. . . Wage stabilization, small business and management-labor relations discussed

WORLD War No. 2 is "a battle between the metalworking industries of our country and its allies and the metalworking industries of our enemies." This was a characterization made by Roe S. Clark in his presidential address before the forty-fifth annual convention and production conference of the National Metal Trades Association, May 26-27, Palmer House, Chicago.

"Production—Key to Victory" was the official theme of the meeting attended by approximately 600 of the country's metalworking executives.

Discussion centered on production incentives, wage and salary stabilization, small business' place in the war effort and management-labor relations.

Mr. Clark heralded the association's job and salary rating programs, which have been approved in many cases by the National War Labor Board as a basis of determining area wage levels, now installed in more than 400 plants. Mr. Clark said employes' rating is invaluable as a means for determining merit increases.

Greater Production for Victory

"If this war has shown anything," he said, "it has proved that to secure victory, bravery and skill of troops in battle must be backed by factories capable of producing more tanks, more airplanes, more shell, more tractors and more guns than can be produced by the enemy. For lack of these things, Poland, Greece, Norway and the low countries were overrun. All the gallantry of the RAF after Dunkirk would not have sufficed had it not been for the loan of some of our metallurgical productions to our ally in her hour of need and the capacity of the British people to produce and use the modern weapons of warfare.

Discussing wage and salary stabilization in the battle against inflation, Dr. Robert K. Burns, chairman, sixth regional War Labor Board, Chicago, reviewed the authority and the executive orders under which the agency operates. He declared the board is a triparte organization with the interest of labor, management and the public represented —a system which is used nowhere else in the world.

Currently, the board is taking the stand that wages as of Sept. 15, 1942, were good wages and is attempting to make its interpretation consistent with that premise.

Incentive as a key to increased production was discussed by Phil Carroll Jr., New York management consultant. "Incentive has been one of the most valuable tools that industry has used in bringing about our present productive capacity as the 'arsenal for the Allies'. It has been a great motivating force in raising our standard of living to its present unparalleled height. These results have come about because incentive, when properly used, adds to wealth by increasing the dollar value.

ROE S. CLARK
Vice president and treasurer, Package Machinery Co., Springfield, Mass., re-elected president of the National Metal Trades Association

H. H. KERR
President, Boston Gear Works, North Quincy, Mass., re-elected first vice president of the National Metal Trades Association

"Good incentive is economically sound and entirely practical. It should be instituted as a help in getting more production per unit of capacity and for conserving manpower. However, it should not be adopted as a device to elude wage stabilization and put in over night so as to pay more money".

C. Scott Fletcher, field development director for the Committee for Economic Development, outlined the employment problem of the postwar period and described the program of the CED.

"Best estimates indicate that if we achieve an employment level of approximately 58,000,000, with a normal workweek, a very satisfactory situation will prevail. Of these 58,000,000 it is estimated approximately 2,000,000 will be in the armed forces, 1,000,000 in war production, which means that civilian employment will have to be found for the remaining 55,000,000. That is 9,000,000 more peacetime jobs than were available in 1940. They will have to be created either in private industry or by the government on public works projects."

Mr. Fletcher emphasized that the "toughness" of this problem indicates: (1) Private enterprise must start postwar planning of products and marketing now; (2) environment in the postwar period must be favorable to the expansion of enterprise.

Discuss Foremen's Problems

Management-labor relations occupied a large portion of the convention program, with especial emphasis on the relationship between foremen and workers.

S. J. Kellerman, Curtiss-Wright Corp., St. Louis, described the foremen's service department established by his company to aid supervisors deal with their men. This department advises foremen in advance as to procedure and enables the foreman to go ahead with confidence that he will be supported by management.

Said Mr. Kellerman: "To this department comes Foreman John Jones, bringing with him a certain set of facts surrounding a violation of company rules by Employe Bill Doakes. Jones, the foreman, is fully conversant with the facts but his question is, "Do the facts constitute a sufficient cause for discharge, sufficient cause to stand the test of a National Labor Relations Board case?" Jones, the foreman, is asked to give all the facts. After that the employe's file is checked for previous reprimands, conduct reports, guard reports and rating sheets. If from an examination of the employe's file and the facts submitted,

it is determined the employe is subject to discharge, Jones is so advised and all the reasons substantiating or sustaining the discharge are fully discussed with him so that he is entirely familiar with every phase of the case.

"Jones is then told that the employe is subject to discharge, if he desires to discharge him. Should he then notify the employe he is discharged, he does so with a feeling of confidence that he will be backed in his decision. Should the employe ask for a special hearing before a board composed of management and the bargaining agent, the foreman knows in advance that he has an open and shut case.

"It may be that upon the examination of the facts surrounding the case certain necessary and material evidence is lacking. The weaknesses of the case are then fully explained to Jones as are the possible repercussions that might follow, should the employe be discharged upon the facts presented. The foreman not having advised the employe in advance that he had been discharged does not now have to 'back water.' If the facts sustain a reprimand, the foreman reprimands the employe. He knows he is on solid ground."

Mr. Kellerman emphasized that the supervisors should be kept advised in advance of company policy.

T. O. Armstrong, industrial relations manager, Westinghouse Electric & Mfg. Co., Springfield, Mass., pointed out that foremen represent company policy to the workers. The foreman is a "key man" because he is in a key position due to his direct and almost constant contact with the men working under him.

Officers elected: Roe S. Clark, president; H. H. Kerr, vice president; and George A. Seyler, second vice president and treasurer.

Mr. Clark is vice president and treasurer, Package Machinery Co., Springfield, Mass.; Mr. Kerr is president of the Boston Gear Works, Quincy, Mass., and Mr. Seyler is vice president of Lunkenheimer Co., Cincinnati.

Councillors named are: Dwight K. Bartlett, Builders Iron Foundry, Providence, R. I.; C. B. Fitts, Standard Electric Time Co., Springfield, Mass.; Harry Arter, Arter Grinding Machine Co., Worcester, Mass.; Dana W. Norris, C. C. Bradley Co., Syracuse, N. Y.; William S. Armstrong, Henry Disston & Sons Inc., Philadelphia; R. A. Mitchell, Pittsburgh Forgings Co., Coraopolis, Pa.; Otto G. Hitchcock, Hays Mfg. Co., Erie, Pa.; J. I. Schultz, National Broach & Machine Co., Detroit; W. D. Hamerstadt, Rockwood Mfg. Co., Indianapolis; T. J. Morton Jr., Hossier Lamp & Stamping Co., Evansville, Ind., and C. R. Rosborough, Moline Tool Co., Moline, Ill.

Ratio Rises Rapidly in War Plants

McNutt says 17,400,000 women of working age will be required for civilian labor force by December, 1943. . . Peak of 15,200,000 reached by March of this year

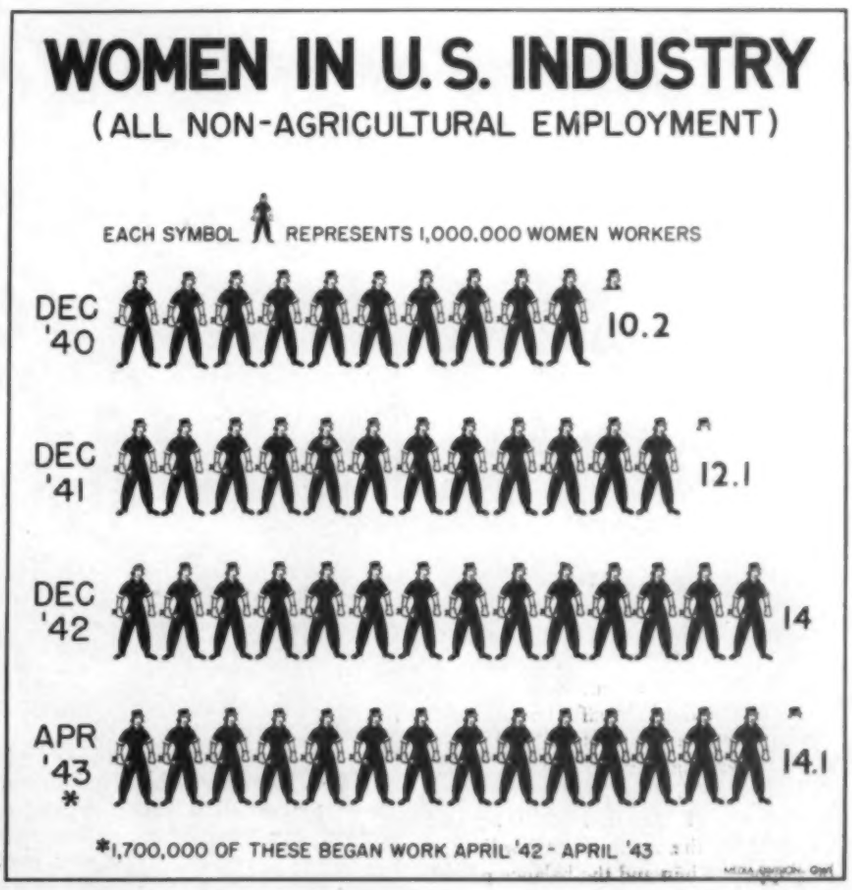
WITH employment of men declining, employment of women is increasing at so rapid a rate the needs of the war industries are being met with gratifying success, Paul V. McNutt, chairman, War Manpower Commission, said last week.

By December, 1943, as high as one-third of the female population of working age—17.4 million women—will be required for civilian labor force and the armed forces.

This figure, said Mr. McNutt, must be regarded as absolute minimum of requirements for additional women since it does not take into account the additional entrants needed to replace women who go off the job. Of the 2 million increased employment of women, munitions industries will absorb 1.3 million and other essential industries 400,000.

Employment of women reached an all time peak of 15.2 million in March, 1943, 1.9 million more than were employed in March a year ago, according to a survey submitted to the chairman. Employment of women in non-agricultural industry . . . 14.3 million in March, 1943—accounted for 1.8 million of the total increase, exactly balancing the loss of men during the period and maintaining the March, 1942, level of 42 million. This large scale replacement of men by women, Mr. McNutt pointed out, raised the proportion of the latter in non-agricultural industry from 30 per cent in March, 1942, to 34 per cent in March, 1943. Total male employment declined over the year 5 per cent, but employment of women went up to 14 per cent.

The overall increases, the chairman explained, blanketed a continuous movement of women from jobs traditionally their own, to new jobs in machine shops, aircraft plants, tank factories and shipyards. The proportion of women in establishments essential to war production visited by representatives of the U. S. Employment Service reporting program, has been increasing steadily and rapidly. The ratio of female to total employment in these war industries rose from 15 per cent in May, 1942, to 25 per cent in March, 1943.



New Steel Warehousing Program Aims To Solve Supply Shortages

EXPANDED aircraft steel warehousing program, mentioned briefly in STEEL, March 29, p. 58, contains four important changes aimed to solve critical shortages and to forestall production delays caused by lack of material in aircraft contractors' plants.

The changes are: 1. An increase in the quantity of steels carried by the warehouses. This increase has been as much as five times the amount previously carried; 2. the amount of material which the warehouse may ship in a given period has been changed from a quarterly to a monthly basis; 3. aircraft manufacturers may issue blanket certificates to cover all future orders on warehouses; and 4. number of warehouses has been increased from 16 to 26.

The new program will be controlled by the Aircraft Scheduling Unit at Wright Field, Dayton, O. Detailed operations will be handled by Capt. A. F. Hitchiner under supervision of Maj. A. M. Baehr, chief, materials co-ordinator unit, and Lt. Col. A. E. R. Peterka, chief of the material distribution branch.

Briefly, the purpose of the program is to supply aircraft manufacturers with both small and emergency requirements of critical aircraft alloy steels. It will also serve in redistributing surplus alloy steels which may accumulate in the plants of aircraft manufacturers.

Located in 26 Cities

Warehouses are located in 26 cities in 11 states and were chosen by the aircraft industry itself. All warehouses have had extensive experience in aircraft steels and the majority have their own metallurgical staffs.

In general, only standard aircraft alloy steels will be earmarked in these warehouses but special provisions have been made to stock one warehouse with certain "nonstandard" sizes and grades which are used by the industry in quantities too small for mill production. If a manufacturer is unable to secure a nonstandard item in this warehouse he should immediately notify the Army Air Forces or Bureau of Aeronautics representative in his procurement district office and request their assistance. If the district office approves this request of a nonstandard specification, it will forward its recommendation to the Aircraft Scheduling Unit in Dayton, which will arrange for the production of a minimum mill quantity. The amount required by the manufacturer will then be shipped to him and the balance placed in the warehouse stock. Production of nonstandard items will be approved only in exceptional cases and manufacturers will do well to explore the use of all available stocks.

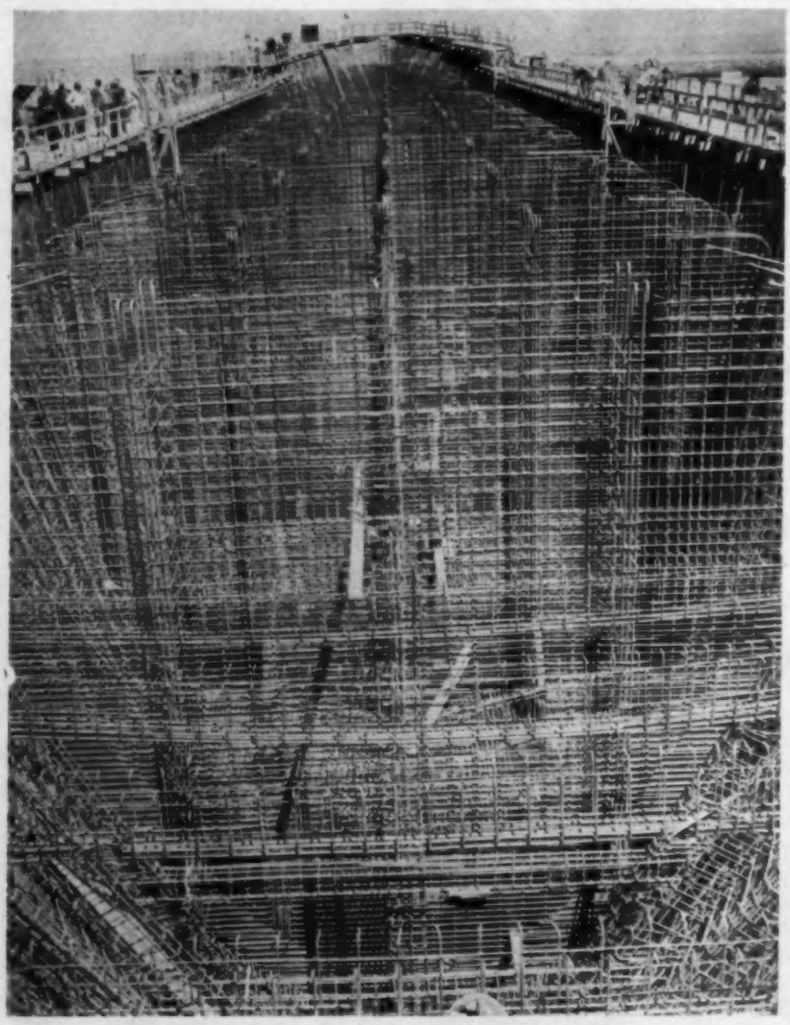
Both welded and seamless steel tubing will be carried by the warehouses but since seamless tubing production facilities are extremely limited, manufacturers should make full use of welded tubing to avoid using more critical items.

The material stocked in these warehouses is restricted for use inside the continental United States except in two special cases where it may be used in the Dominion of Canada.

These earmarked aircraft steels may be used only for aircraft construction, maintenance, repair, and airborne parts including the airframe, engine, propeller, accessories and any other regular equipment for the airplane. These steels may not be used for jigs, fixtures, or ordinary ground equipment, whether or not this equipment might be flown to an advance base.

Warehouses may release these aircraft steels in only three ways: 1. Directly to the manufacturers of the approved parts; 2. To modification centers and army and navy supply depots; or 3. For the maintenance or repair of aircraft and airborne equipment.

Procedure for obtaining steel from the warehouse is simple: The manufacturer places his order with the nearest warehouse and if the material is not available in this particular warehouse he notifies the Aircraft Scheduling Unit, which will try to locate the material



WHAT IS IT?—A CONCRETE BARGE

SOMETHING new is added to the war effort as a concrete barge nears completion at a Belair shipyard, San Francisco. The barges, 364 feet long, are made of reinforced concrete to release steel and iron for other war uses. NEA photo

in one of the other designated warehouses. If the steel is not stocked by any of the 26 warehouses but has been ordered by one of them—and if the need of this steel can be classed as an emergency—the manufacturer should obtain proper certification from his procurement district office. The Aircraft Scheduling Unit will then order the warehouse which is to receive the steel to ship the required amount to the manufacturer even though the warehouse has accepted predated orders for this same steel.

In the scheduling of his production the manufacturer must remember that in any calendar month he cannot place an order for the purchase of warehouse stock of any one size and specification in quantities equal to or greater than those shown in the Earmarked Stock Directive No. 6. Manufacturers who do not have a copy of this directive may secure one by writing their procurement district office or the Aircraft Scheduling Unit. In the case of a production emergency this ruling may be relaxed but only with the approval of the Aircraft Scheduling Unit.

To speed up deliveries of the steel from the warehouse, manufacturers may now use a blanket certification. This certification will state that the steel requested is to be used only on authorized products and this will be accepted by the warehouse unless it has reason to believe the material will not be used as specified. In such cases the warehouse may withhold shipment pending an investigation by the procurement district office.

In order to maintain the proper balance of stock in the warehouse and prevent tying up important materials, warehouses will not set aside certain lots for longer than seven days awaiting receipt of the purchase order.

An added feature of the program makes it possible for the warehouse to assist the manufacturers in the redistribution of surplus stocks. The warehouse will be notified by the Aircraft Scheduling Unit when such surplus stocks are available and it has been instructed to purchase them from the manufacturer whenever possible. Thus the manufacturer will be relieved of the necessity of filling small orders from other contractors and will be saved considerable expense.

A detailed copy of the program, the Earmarked Aircraft Stock Directive No. 6 and a complete list of steels to be stocked by the warehouse may be secured from procurement district offices or the Aircraft Scheduling Unit. Following are official aircraft steel warehouses:

Aircraft Steel & Supply Co., 415 N. Water St., Wichita, Kans.; Baker Steel & Tube Co., 955 S. Alameda St., Los Angeles; Columbia Steel Co., Seattle Wash.; Crucible Steel Co., Halcomb Warehouse, State Fair Boulevard, Syracuse, N. Y.; Ducommun Metals & Supply Co., 4890 S. Alameda St., Los Angeles; Edgcomb Steel Co., 430 Hillside Ave., Hillside, N. J.; Peter A. Frasse & Co. Inc., 17 Grand St., New York; Peter A. Frasse & Co. Inc., 3921 Wissahickon Ave., Philadelphia; Garrett Supply Co., 3944 Santa Fe Ave., Los Angeles; Hamilton Steel Co., Taft Ave., Cleveland; Earle M. Jorgensen Co., 5311 Clinton Drive, Houston, Tex.; Earle M. Jorgensen Co., 10510 S. Alameda St., Los Angeles.

Metal Goods Corp., 16 Drennan St., Houston, Tex.; Metal Goods Corp., 5239 Brown Ave., St. Louis; Miller Steel Co., 49 Empire St., Newark, N. J.; Joseph T. Ryerson & Son Inc., Rockwell St., Chicago; Joseph T. Ryerson & Son Inc., Front St., Cincinnati; Joseph T. Ryerson & Son Inc., 5 Clinton St., St. Louis; Joseph T. Ryerson & Son Inc., 203 Westside Ave., Jersey City, N. J.; S.A.E. Steels Inc., 1420 East 47 St., Cleveland; Service Steel Co., 1435 Franklin St., Detroit; U. S. Steel Supply Co., 1319 Wabansia Ave., Chicago.

Wheelock-Lovejoy Co., 288 Court St., Buffalo; Wheelock-Lovejoy Co., 3201 Bellevue Ave., Detroit; Chicago Steel Service Co., 39th and Ashland Ave., Chicago; Aircraft Steel & Supply Co., Dallas, Tex.

Army Air Forces procurement district offices may be addressed as follows: (Bureau of Aeronautics representatives are also located in these offices):

District Supervisor, Eastern Procurement District, AAF Materiel Command, 11th Floor, 67 Broad St., New York; District Supervisor, Central Procurement District, AAF Materiel Command, 8505 West Warren Ave., Detroit; District Supervisor, Midwestern Procurement District, AAF Materiel Command, Municipal Airport, P. O. Box 117, Wichita, Kans.; District Supervisor, Western Procurement District, AAF Materiel Command, 3636 Beverly Boulevard, Los Angeles.

Dismantled Buildings To Net 4000 Tons of Scrap

Dismantling of nine buildings of the John B. Stetson Co. plant in Philadelphia will result soon in making available for war production 4000 tons of high grade scrap.

The buildings with a total of 350,000 square feet of floor space, were built between 1891 and 1923. Production facilities formerly occupying the space were consolidated by the company in the interests of greater efficency for war production operations. Usable machinery and equipment were removed for use in other sections of the plant.

G-E Produces Movie To Aid Training of Welders

General Electric Co., Schenectady, N. Y., has produced another sound movie titled "The Inside of Atomic-Hydrogen" to aid in training men and women welders for war jobs. The movie, produced in two parts, is available to public, private, and industrial welding schools as well as other groups.

Produced by the Raphael G. Wolff Studios. Hollywood, the welding movie was directed by the General Electric welding laboratories.

Closer Parts Scheduling Is Declared Vital

DESPITE outstanding successes to date, the enlarged aircraft production goals for this year and next, calling for heavier planes and greater volume, can only be met through the most exact scheduling of the output of the "parts and pieces" needed in their manufacture, Charles E. Wilson, executive vice chairman of the War Production Board said last week.

Outlining developments and progress in aircraft production, Mr. Wilson asserted the recently adopted plan for scheduled production and distribution of plane components is vital to the continued success of the present program.

"There are at present no serious bottlenecks in the assembly of such fundamental plane parts as propellers, engines, or airframes. Temporary but serious minor bottlenecks, however, in smaller and less obvious categories, such as forgings and extrusions, have not yet been entirely overcome.

In reporting on the current volume of aircraft production, he said, "the two most significant developments in the aircraft program to date are the increased emphasis on heavy—and heavier—bombers, dictated by the proved quality and effectiveness of these craft, and the steady increase in the average weight of all combat types, representing additional firepower, armor, bomb load, and overall performance.

"While we produced almost twice as many planes last month as we did in April, 1942, their total weight was almost three times greater. By the same month next year, our schedules call for more than three times as many aircraft as in April, 1942, weighing six times as much. The average weight per plane this year is 30 per cent greater than last. In 1944, this figure will rise to 60 per cent. Demands for steel, aluminum, and other light materials must increase proportionately.

"American factories turned out almost four times as many heavy bombers last month as were produced in April a year ago. Ten per cent of all the planes that rolled from the assembly lines last month were four-engine bombers, compared to less than five per cent a year ago.

"By April of next year, schedules call for the production of today's heavy bombers at a monthly rate eight times greater than in the like month in 1942. This does not include the scheduled output of the new super-bombers."

"Must Keep Shoulder to Wheel," Nelson Tells Industrial Buyers

WPB chairman warns democratic system is on trial. . . Praises industry and labor for job well done so far but stresses need for continued effort. . . Material and supply problems discussed by prominent government authorities

WARNING the nation that our democratic system is on trial, Donald M. Nelson, chairman, War Production Board, addressing the twenty-eighth annual convention and war conference of the National Association of Purchasing Agents in New York last week, said, "The thing that worries me most at the moment is whether or not we can stand success as well as we can stand adversity.

"We did put our shoulders to the wheel to get where we are today, but we've got to continue to keep it there and keep it there every single day, together—not apart—until this job is done."

Industry and labor were praised by the WPB chairman in breaking production record after production record but he sounded the warning that we can win the war only if we continue to work together.

War "Can Be Shortened a Year"

"We on the home front must be just as determined as those on the fighting front," he said.

Mr. Nelson said he recently visited Aberdeen Proving Ground in company with Maj. Gen. Levin H. Campbell and was "thrilled" with our weapons which are superior in killing-power to those of our enemies. However, he declared, "We have a long way to go before this war is won. Don't you believe that the enemy is in a trap and all we have to do is spring it tomorrow".

Mr. Nelson made no prediction as to the possible termination of the war but he did say it can be shortened a year, "if we continue to apply ourselves to the job of winning a war, and keeping our minds everlastingly on that job of winning a war, and not letting anything come in between, least of all personal self-interest, a thing that would destroy any co-operative effort".

In his first public address since taking over direction of the Office of Civilian Requirements, Arthur D. Whiteside, WPB vice chairman, declared industry has been converted too far to the production of military equipment and supplies. Further, he said it appeared perfectly obvious that we must draw to some extent on our supplies of critical materials to place our civilian economy back in balance.

"At present our country faces a condition without precedent", Mr. Whiteside said, "with 60 per cent of our entire productive capacity converted to the production of munitions, apparel, equipment and supplies for the armed forces. As a result, we have reached a point where the materials and productive capacity of many essential products have been too far diverted and readjustments must be made to produce specific products absolutely essential to maintain even the minimum standards of living in this country".

Mr. Whiteside explained that it will take at least two or three months to work out plans for the protection of the civilian economy effectively. The immediate program of the OCR, however, is to provide:

1.—Tools and equipment necessary to produce the food and extract the natural resources which are basic to the combined programs.

2.—Articles required by children and invalids and to maintain health.

3.—Clothing and equipment for workers.

4.—Necessities for homes.

5.—Hundreds of other scarce but necessary items.

The total quantity of end-products available to the civilian economy during the next 12 months will be less than during the past year, he said, but many items which have entirely disappeared from retail shelves or are scarce will be replenished to meet minimum needs.

Mr. Whiteside said he felt it necessary for men coming home from the battlefronts after the war to find a sound civilian economy. Further, it is necessary to keep plants producing civilian items in operation since it would be too difficult to restore our economy to proper balance later.

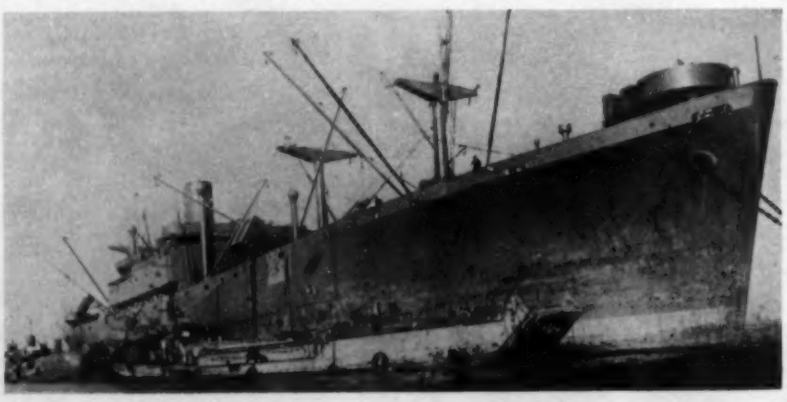
One of the features of the war conference was a general session on the Controlled Materials Plan. The Plan was explained in detail by experts from Washington and industry, each of several speakers taking a specific phase.

New CMP Instructions Specific

Instructions for filling out a bill of materials as originally issued Nov. 14, 1942 will be revised, according to Walter C. Skuce, director, Controlled Materials Plan, WPB. The new instructions will be more specific and more readily understood. Forms will not be changed. The "B" product list also will be rearranged to make it easier to use.

In third quarter under CMP, Washington officials propose to "firm up" as many production schedules as possible so that advance allotments and advance production authorizations can be made. In some instances, these will cover several quarters.

Mr. Skuce said this will permit purchasing farther in advance than has been possible under CMP to date. It will also



MORE WEAPONS FOR NORTH AFRICAN ARMIES

TANK landing craft are valuable not only as an offensive weapon but also prove their mettle unloading supplies for the British Eighth Army from a Liberty ship in North Africa. The long, low barge is shown beside the supply ship receiving the valuable stores. NEA photo

ROOSEVELT AND CHURCHILL DISCUSS "OFFENSIVE" WITH PACIFIC WAR COUNCIL

WASHINGTON bustled with military activity as President Roosevelt and Prime Minister Winston Churchill layed plans for the Pacific theatre of action. They gave the Pacific War Council shown here a lengthy and apparently optimistic review of the war situation. Left to right: T. V. Soong, China; Lord Halifax, Great Britain; Herbert Evatt, Australia; Prime Minister Churchill; President Roosevelt; Prime Minister W. L. MacKenzie King, Canada; Leighton McCarthy, Canada; Alexander Loudon, Netherlands, and Manuel Quezon, representative of the Philippines. NEA photo

reduce the amount of paper work required since advance quarter allotments will not need to be renewed during subsequent quarters.

Also, he said, it is planned to place allotments completely on a quarterly basis, thus eliminating the monthly percentage restrictions on placing orders. The obligation to distribute material purchases and shipments will be placed directly on the manufacturer himself.

Explains Inventory Restrictions

Charles M. Schoenlaub, Production Controls Bureau, WPB, explained that while the inventory restrictions of CMP regulation No. 2 apply only to controlled materials (steel, copper and aluminum) they are supplemented by Priorities Regulation No. 1 which imposes restrictions of broader scope in providing that all materials, not just controlled materials, must be held at minimum practible working levels.

John H. Martin, program implementation officer, WPB, said Priorities Regulation 11-b, with accompanying form PD-870, is being set up to take care of companies not operating under CMP. Under this regulation, companies making Class B products will simply make a list of materials required. If the program of manufacture is approved, proper ratings may be extended to suppliers.

Allocation orders will continue in effect on metals other than steel, copper and aluminum, he said, but there will be a tendency to coordinate them with CMP regulations. P orders will continue in effect for certain large users of MRO supplies.

A new order, M-293 covering the Component Scheduling Plan, goes into effect June 1. Under this order, Mr. Martin said, production of components may be scheduled well in advance.

Delivery of controlled materials from warehouse has been greatly simplified by CMP regulation No. 4, declared Thomas Z. Hayward, Joseph T. Ryerson & Sons Co., Chicago, but the restrictions imposed by priorities regulations still apply.

In discussing CMP regulation No. 5, William E. Arnstein, CMP Division, WPB, New York, said the most important change seems to be the raising of the rating assigned to schedule II manufacturers for MRO supplies from AA-2x to AA-2. At the same time, an equally important change was the raising of the rating to manufacturers not included in the schedules from A-10 to AA-5.

Gilbert L. Hartman, purchasing agent, the Oilgear Co., Milwaukee, told how his company operates under CMP as a manufacturer of class A products. As a manufacturer of hydraulic units for light and medium tanks, the Oilgear company sells, as secondary producers, to tank builders.

Mr. Hartman explained that cards are issued only for commodities requiring special procedures. Those following a basic pattern are omitted. "It is our experience that if we follow the instructions on the card and have each requisition properly checked, we reduce to a minimum the possibility of having the order returned by the vendor because of insufficient information," he said.

As a producer of class B products, Harold V. Chisholm, purchasing agent, The Walworth Co., Boston, said it is necessary to follow a fixed procedure in order to assure continuous operations in the company's plants. In preparing the preference rating and claimant agency pattern, the assistance of an accountant is very important, he said.

Elect District Vice Presidents

B. R. Newberry, director of purchases and material, Lone Star Gas Co., Dallas, Tex., was elected president of the National Association of Purchasing Agents succeeding Roy C. Haberkern, purchasing agent, R. J. Reynolds Tobacco Co., Winston-Salem, N. C.

Newly elected district vice presidents are:

District 1, Lee A. Baumhover, City of Portland, Oreg.; District 2, O. E. McClatchey, Barnsdall Oil Co., Tulsa, Okla.; District 3, Emil H. Jones, E. R. Wagner Mfg. Co., Milwaukee; District 4, Gerald R. Smith, Indiana Service Corp., Ft. Wayne, Ind.

District 5, Leonard Tolson, Maclean Publishing Co. Ltd., Toronto, Ont.; District 6, Gordon S. Yost, Toledo Scale Co., Toledo, O.; District 7, W. M. Kerrick, the Mengel Co., Louisville, Ky.; District 8, George L. McCaffrey, Owen Dyneto Division, Auto-Lite Battery Corp., Syracuse, N. Y.; and District 9, R. C. Swanton, Winchester Repeating Arms Co., New Haven, Conn.

Face-Saving Concessions Granted United Mine Workers by NWLB

SUBSTANTIAL victory for John L. Lewis and his United Mine Workers was written into last week's decision by the War Labor Board in the coal wage dispute.

Although the board held firm in denying the miners the $2-a-day wage increase demanded, it allowed concessions which are expected to increase the miners' pay by $1 a day. These included directions that mine operators "negotiate" the union's request for portal-to-portal pay, with strong indications the board would back up the miners' demands, and other upward adjustments in pay.

These adjustments, added to wage boosts of more than 15 per cent allowed since Jan. 1, 1941, are acknowledged by board members to have raised the level of miners' earnings above the scale established by the "Little Steel" formula. If the new commission proposed by the board to study the six-day week finds a way "to assure the mine workers a greater benefit than they now enjoy" under six-day operation, it is believed by competent observers that an irreparable breach will be made toward inflation.

Mixed Question of Law

The board pointed out that the controversy over portal-to-portal pay presents a mixed question of law and fact which, in the absence of a specific court determination binding on both employers and employes, can and should be settled by them in collective bargaining.

The decision recommended that the parties mutually agree on a reasonable contract provision wherever the miners are operating six days a week whereby the operators will give a fair and equal opportunity to individuals to work during each of the six days. The board also suggested that such a contract provision might include a stipulation that the operator hire no additional workers until employes have full opportunity.

The miners will get $50 vacation pay instead of $20 as provided in the old agreement; occupational charges to be paid hereafter by the operators include charges for safety equipment and working tools, but personal wearing apparel such as hats, clothing, shoes and goggles are to be bought by the individual.

The miners were denied their request for payment of double time for all work performed on Sunday.

Other disputed issues recommended for negotiation by the board included the idea that the operators should be responsible for delivering mine cars to and from working faces in all mines, suitable provision for protecting wage scales and conditions of employment existing whenever a mine under contract is let for operating purposes and reasonable reclassification of the occupation of greasers, trappers, flaggers, switch throwers and slate pickers.

Plan Working Out

Labor-management committee record past year shows approach to production problem sound

LABOR-MANAGEMENT Production Committees, sponsored by the WPB, after one year's operation have demonstrated convincingly this approach to the problem of increased production is sound and extremely effective, states Donald M. Nelson, WPB chairman.

"In the year in which this plan has been in operation it has made splendid progress," Mr. Nelson said. "Reports from the Labor-Management Production Committees on the range of activities in which they are engaged indicate the sincerity and realism with which they have tackled the greatest production task any nation has ever faced."

Principle activities of these committees consist of operating suggestion systems, information and morale building programs, conservation of materials, safety programs, transportation of workers, absenteeism campaigns and general consideration of production problems.

Major accomplishments of the committees are indicated by the first labor management activities survey, the analysis being based on reports received by War Production Drive headquarters from 800 out of 2000 committees now being canvassed. These 800 represent almost 2,000,000 workers, approximately 45 per cent of all workers employed in plants where labor management production committees are set up.

Additionally, the survey showed a high percentage of the committees are conducting programs related to quality control, care of tools and equipment, training, nutrition and health. Seventy-five per cent of the employees, the analysis showed, are represented on the joint labor management committees by the A. F. of L. and the CIO.

Here tabulated are the principal labor-management production committee activities, in their order of popularity, with the percentage of committee participation, based on 800 reports and representative of close to 2,000,000 workers: Information and morale-building programs—94.9; suggestions—9.9; conservation of materials—87.6; safety—87.6; transportation—84.9; absenteeism—82.4; care of tools and equipment—73; production problems—72.9; quality control—67.4; training—48.9; and nutrition and health—38.6.

Lesser activities include special production problems, such as cost reduction, machine tool capacity, idle time, gas and air and electrical equipment; plant housekeeping; fire protection; plant protection; movies; letters to service men; book collections; employment; music; uniforms; home nursing; Red Cross training; timekeeping; policy radio and news; gifts; sanitation; vaccinations, medical clinic; credit union and assistance on taxes.

Labor Shortage Becomes More Acute in Nine Areas

Nine communities have been added to the War Manpower Commission's list of areas where acute labor shortages exist. These are: Akron, O.; Chambersburg, Pa.; Pine Bluff, Ark.; Salt Lake City, Utah; San Francisco; Sturgeon Bay, Wis.; Trenton, N. J.; Wilmington, Del.; and Jacksonville, Fla. There are now 42 areas in this classification.

Supply of labor has improved in Des Moines, Iowa, and Manitowoc, Wis., but has become tighter in Benton Harbor, Mich., Providence - Pawtucket - Woonsocket, R. I., and San Jose, Calif. These communities now being classified as areas in which a labor shortage may be anticipated within six months. Connersville, Ind., has been classified for the first time and placed in this group.

Areas in which a general labor shortage may be anticipated after six months include the following, indicating a freer supply: Elmira, N. Y., Hagerstown, Md., Joliet, Ill., Marion, O., Williamsport, Pa.; as well as the following, indicating a tighter supply: Augusta, Ga., Boston-Quincy-Hingham, Mass., Columbus, Ga., Fitchburg, Mass., and Nashua, N. H. The cities of North Adams, Mass., and Spartansburg, S. C., have been classified for the first time and placed in this group.

Areas which have been added to the classification indicating that the labor supply is and will continue to be adequate to meet all known labor requirements are: Minneapolis-St. Paul, Minn., Newburgh, N. Y., Omaha-Council Bluffs, Neb.-Iowa, Poughkeepsie, Bristol-Kingsport, Tenn., Terre Haute, Ind., and Point Pleasant, W. Va.

"Hold the Line" Forces Battle Inflation Leaks

LABOR disturbances are steadily pushing the problem of ineffectual control of living costs to the forefront among chronic wartime headaches.

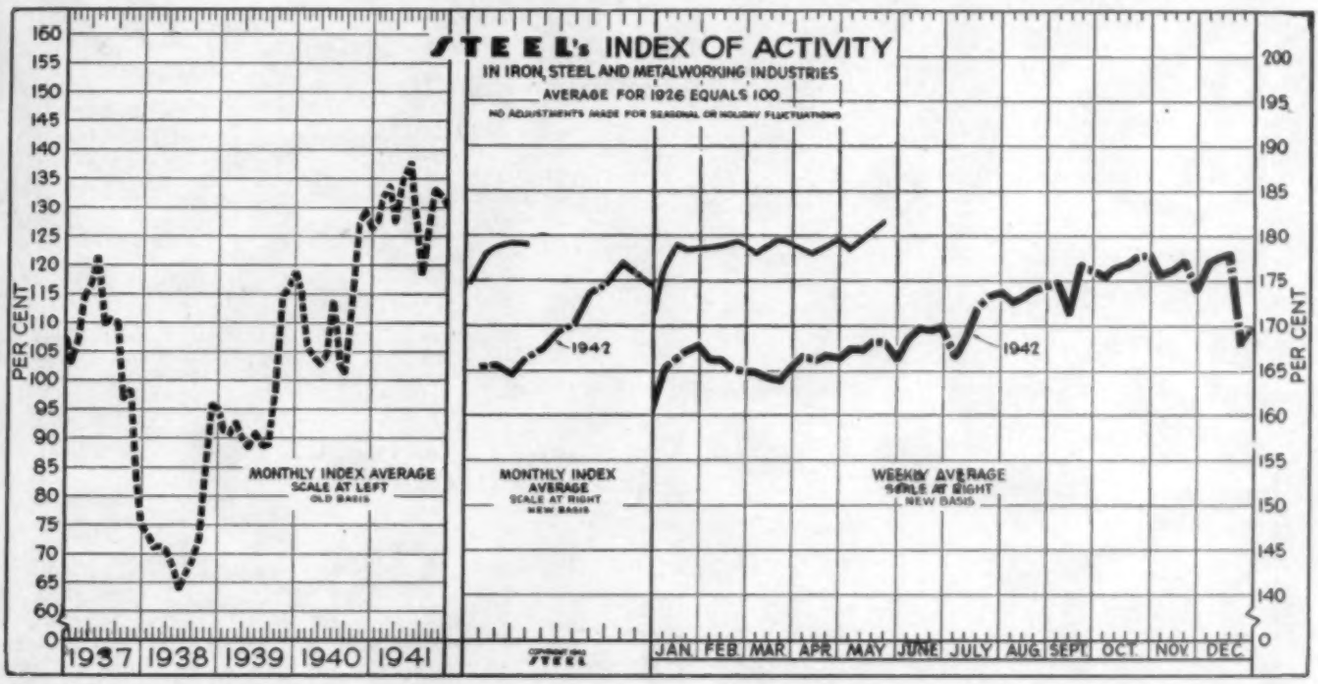
Recurrence of strikes in automotive and rubber industries and the haze of uncertainty which hangs over future coal mining operations are speeding government efforts to hold the line against inflation and save its agencies of stabilization from complete rout.

Particularly distressing to the business community is the spectacle of frantic last-minute improvisations to hold together the OPA's creaking price control machinery and an impression of weakened War Labor Board policy toward demands for modification and ultimate elimination of the "Little Steel" wage yardstick.

Thousands of applications for wage increases, frozen by the original "hold the line" directive, are being revived and presented to WLB as "gross inequity" cases. As the pressure for adjustments increases, the board's position becomes less secure and, as seems likely in the coal decision where fact-finding bodies may favor the miners with further concessions on portal-to-portal, overtime and other claims, the policy of temporizing will nullify much of the effort to hold inflationary forces in check.

That rank and file unionism has little understanding of methods and objectives of the stabilizers is seen in its readiness to flout the nonstrike pledge of its leaders. Here also discipline is lacking.

OPA is now ready to introduce a palliative in the form of price rollbacks through which it hopes to wipe out all but about 18 per cent of the increase in living costs which has taken place since January, 1941. The program recommended to Congress embraces food price cuts ranging from 10 to 40 per cent, with reductions on a number of items to be taken up through subsidies, and imposition of flat dollars and cents ceilings on all food products.



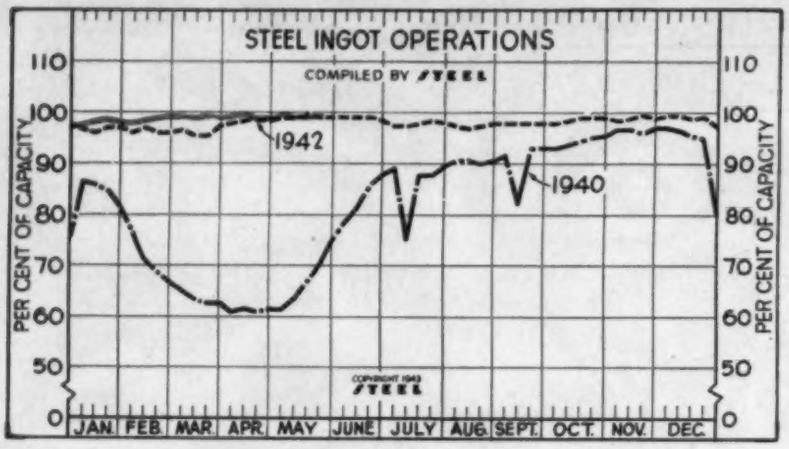
STEEL'S index of activity advanced 0.9 point to 182.0 in the week ending May 22:

Week Ended	1943	1942
May 22	182.0†	168.3
May 15	181.1	168.4
May 8	179.1	167.4
May 1	178.5	167.4
April 24	179.3	166.4
April 17	178.8	166.7
April 10	178.8	166.2
April 3	178.5	166.7
Mar. 27	179.2	165.5
Mar. 20	179.6	163.9
Mar. 13	179.0	164.1

†Preliminary.

Mo. Data	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932
Jan.	178.1	165.7	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6
Feb.	178.8	165.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3
March	179.0	164.6	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2
April	178.8	166.7	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8
May	....	167.7	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8
June	....	169.4	138.7	114.1	90.9	63.4	109.9	100.8	77.4	80.6	70.3	51.4
July	....	171.0	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1
Aug.	....	173.5	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0
Sept.	....	174.8	126.4	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5
Oct.	....	176.9	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4
Nov.	....	175.8	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5
Dec.	....	174.1	130.2	126.3	118.9	93.1	74.7	107.6	88.2	58.9	54.0	46.2

Note: Weekly and monthly indexes for 1942 and 1943 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production



Steel Ingot Operations

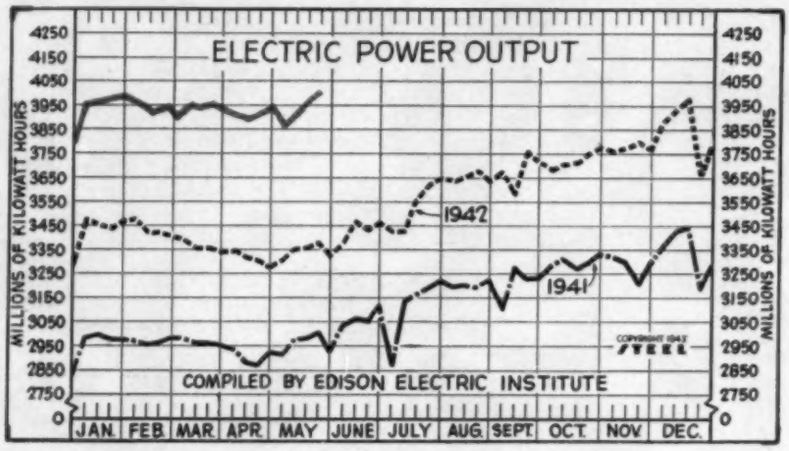
(Per Cent)

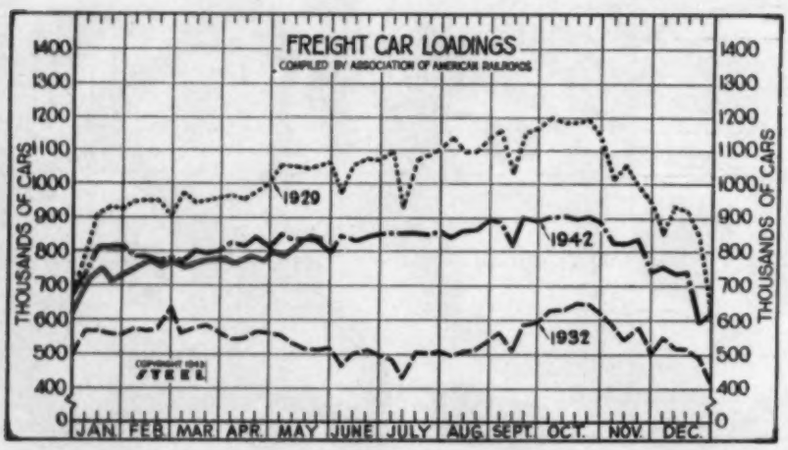
Week ended	1943	1942	1941	1940
May 22	99.0	99.0	100.0	75.0
May 15	98.5	99.5	99.5	70.0
May 8	98.5	99.0	97.5	66.5
May 1	99.5	99.0	95.0	63.5
April 24	99.0	98.5	96.0	61.5
April 17	99.0	98.5	98.0	61.5
April 10	99.5	98.5	98.0	61.0
April 3	99.5	98.0	98.0	61.5
Mar. 27	99.0	97.5	99.5	61.0
Mar. 20	99.5	95.5	99.5	62.5
Mar. 13	99.0	95.5	98.5	62.5
Mar. 6	99.5	96.5	97.5	63.5
Feb. 27	99.5	96.0	96.5	65.5
Feb. 20	99.5	96.0	94.5	67.0
Feb. 13	99.0	97.0	96.5	69.0
Feb. 6	98.5	96.0	97.0	71.0

Electric Power Output

(Million KWH)

Week ended	1943	1942	1941	1940
May 22	3,993	3,380	2,838	2,449
May 15	3,969	3,357	2,800	2,422
May 8	3,904	3,351	2,792	2,387
May 1	3,867	3,305	2,734	2,386
April 24	3,925	3,273	2,750	2,398
April 17	3,917	3,308	2,702	2,422
April 10	3,882	3,321	2,721	2,418
April 3	3,890	3,349	2,779	2,381
Mar. 27	3,928	3,345	2,802	2,422
Mar. 20	3,947	3,357	2,809	2,424
Mar. 13	3,945	3,357	2,818	2,460
Mar. 6	3,946	3,392	2,835	2,464
Feb. 27	3,893	3,410	2,825	2,479
Feb. 20	3,949	3,424	2,820	2,455
Feb. 13	3,939	3,422	2,810	2,476
Feb. 6	3,960	3,475	2,824	2,523
Jan. 30	3,977	3,468	2,830	2,541


ELECTRIC POWER OUTPUT
MILLIONS OF KILOWATT HOURS
1942
1941
COMPILED BY EDISON ELECTRIC INSTITUTE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.



Freight Car Loadings

(1000 Cars)

Week ended	1943	1942	1941	1940
May 22	845†	838	866	687
May 15	848	839	861	679
May 8	816	839	837	681
May 1	789	859	794	665
April 24	794	816	722	644
April 17	781	847	709	628
April 10	789	814	680	619
April 3	772	829	683	603
Mar. 27	787	805	792	628
Mar. 20	768	797	768	620
Mar. 13	769	799	758	619
Mar. 6	748	771	742	621
Feb. 27	783	781	757	634
Feb 20	752	775	678	595

†Preliminary.

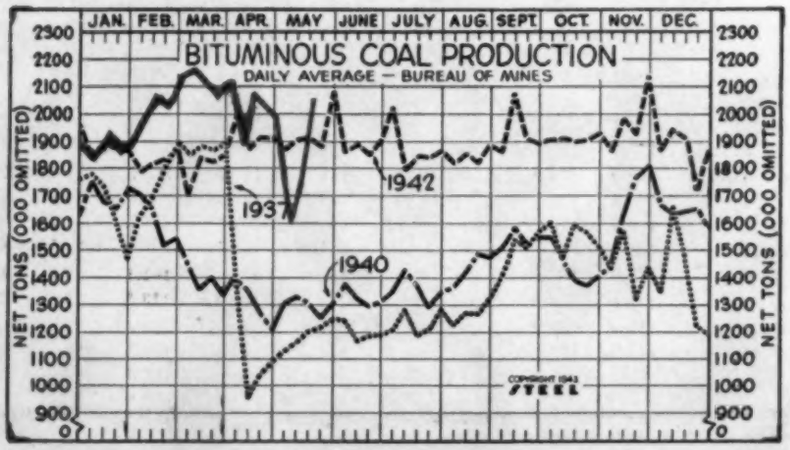
Bituminous Coal Production

Daily Average

Net Tons (000 omitted)

Week ended	1943	1942	1941	1937
May 15	2,042†	1,913	1,693	1,203
May 8	1,700	1,903	1,567	1,163
May 1	1,584	1,877	867	1,126
April 24	1,963	1,916	267	1,092
April 17	2,017	1,919	233	1,041
April 10	2,067	1,875	200	953
April 3	1,858	2,019	665	1,381
Mar. 27	2,108	1,858	1,950	1,895
Mar. 20	2,060	1,825	1,879	1,871
Mar. 13	2,100	1,842	1,844	1,883
Mar. 6	2,125	1,693	1,791	1,851
Feb. 27	2,113	1,878	1,736	1,897
Feb. 20	2,027	1,833	1,736	1,807

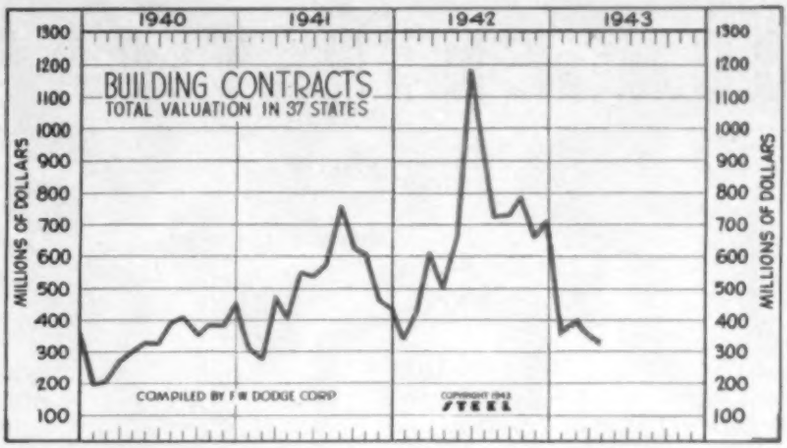
†Preliminary.

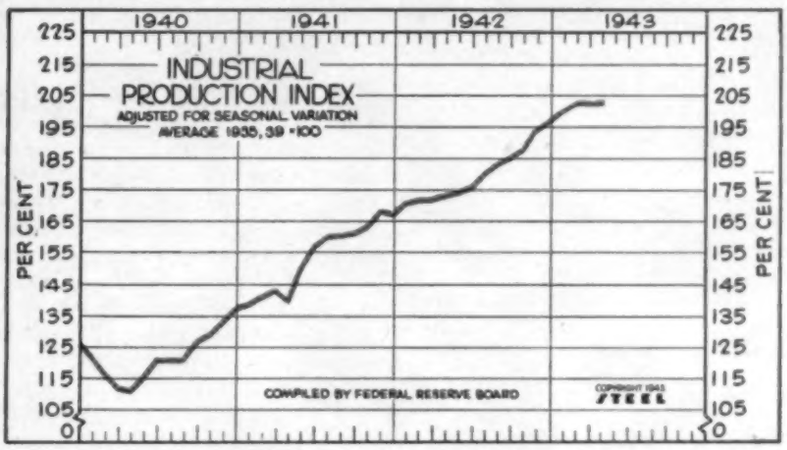

BITUMINOUS COAL PRODUCTION
DAILY AVERAGE — BUREAU OF MINES
NET TONS (000 OMITTED)
1942
1937
1940
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Construction Total Valuation In 37 States

(Unit: $1,000,000)

	1943	1942	1941	1940	1939
Jan.	$350.6	$316.8	$305.2	$196.2	$251.7
Feb.	393.5	433.6	270.4	200.6	220.2
Mar.	339.7	610.8	479.9	272.2	300.7
April	303.4	498.7	406.7	300.5	330.0
May	.	673.5	548.7	328.9	308.5
June	.	1190.3	539.1	324.7	288.3
July	.	943.8	577.4	398.7	299.9
Aug.	.	721.0	760.3	414.9	312.3
Sept.	.	723.2	623.3	347.7	323.2
Oct.	.	780.4	606.3	383.1	261.8
Nov.	.	654.2	458.6	380.5	299.8
Dec.	.	708.7	431.6	456.2	354.1
Ave.	.	$687.9	$500.6	$333.7	$295.9





Industrial Production
Federal Reserve Board's Index

(1935-39 = 100)

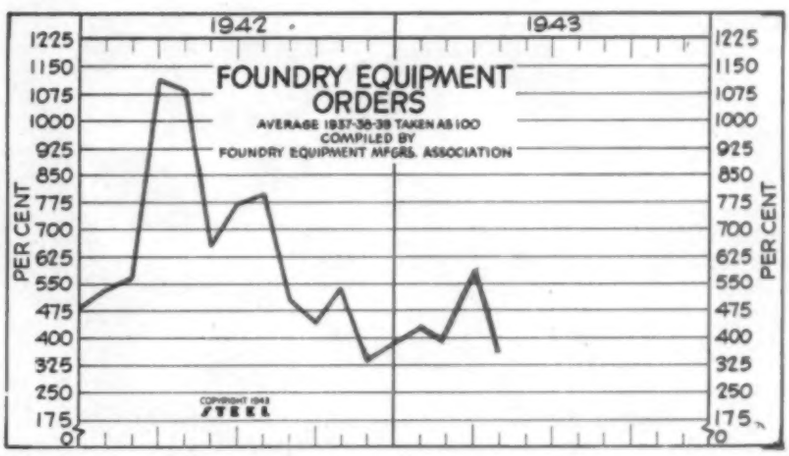
	1943	1942	1941	1940	1939
Jan.	199	171	139	122	102
Feb.	202	172	141	116	101
March	202	172	143	112	101
April	203	173	140	111	97
May	...	174	150	115	97
June	...	176	157	121	102
July	...	180	160	121	104
Aug.	...	183	160	121	104
Sept.	...	185	161	127	113
Oct.	...	189	163	129	121
Nov.	...	194	168	133	124
Dec.	...	197	167	138	126
Year Ave.	...	181	154	122	108

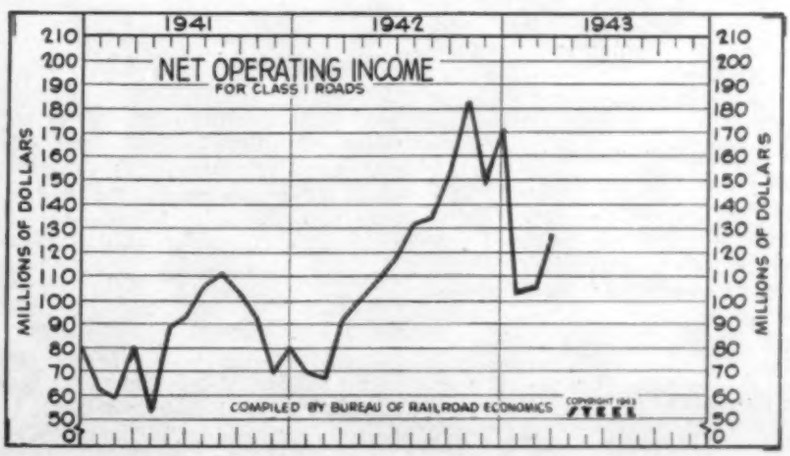
Foundry Equipment Orders

Monthly Average

(1937-38-39 equals 100)

	1943	1942	1941	1940
Jan.	429.8	532.7	285.3	149 0
Feb.	399.5	567.9	281.1	135.7
March	562.7	1122.4	315.2	183.2
April	362.7	1033.8	377.2	145.2
May	.	653.6	298.7	129.1
June	.	774.0	281.1	164.9
July	.	800.8	358.1	194.4
Aug.	.	510.8	312.9	165.4
Sept.	.	446.4	363.8	161.2
Oct.	.	540.6	403.8	264.0
Nov.	.	338.8	408.5	254.2
Dec.	.	382.5	481.2	257.8
Year	.	646.7	345.6	184.0





Class I Railroads
Net Operating Income

(Unit: $1,000,000)

	1943	1942	1941	1940
Jan.	$105.30	$68.97	$62.02	$46.01
Feb.	106.13	66.49	58.48	32.86
Mar.	129.65	92.39	80.63	37.03
April	.	102.03	52.57	34.12
May	.	109.63	88.63	47.41
June	.	118.73	93.26	48.09
July	.	133.00	106.31	57.73
Aug.	.	135.26	111.32	66.53
Sept.	.	154.63	104.07	74.72
Oct.	.	184.68	93.66	87.64
Nov.	.	148.95	68.76	72.00
Dec.	.	170.85	80.55	78.79
Average	.	$123.80	$83.29	$56.84

CONCENTRATION

Of Industries

What is "concentration"; why is it necessary; what will be its effect upon your operations; what has Britain learned about concentration??

By HENRY A. DINEGAR
Chief
Durable Goods Branch
Consumer Goods Division
War Production Board

ANNOUNCEMENT by Donald Nelson that production would be concentrated in a number of industries has caused much questioning as to what is meant by concentration of production, why it is necessary, and what effect it will have upon industries.

Although the War Production Board has approved the principle of concentration, it has not as yet put it into practice on a broad scale. Our experience has been of such short duration that it is not possible to foretell at this time all that may be necessary in concentrating production, or even to say to which industries the principle will be applied. *It may be helpful to explain under what conditions industry is likely to be concentrated and by stating the objectives of the War Production Board policy in this field.*

Concentration of production means merely bringing together into fewer plants working at somewhere near their full capacity all the production in an industry. This concentration is *possible* only where the output of a product must be curtailed to a level below the capacity of the industry. But it is *necessary* only when it will release to the war program needed resources such as materials, plant facilities, labor, electric power, or transportation, or when permitted production is so far below capacity that plants are unable to continue in production without concentration.

Thus concentration will be undertaken only when there is assurance that it will aid in war production or that it is necessary to ensure essential civilian supplies. Where this assurance is lacking, there will be no concentration by the War Production Board.

For light on the problems of concentration both from the point of view of industry and the government, we may look to Great Britain. The British government announced a policy of concentration in March 1941. It has therefore nearly two years more experience than we have.

Of course one must recognize the important differences between the two countries which make it impossible for us merely to copy British policy in detail. America is so much larger than Great Britain that transportation problems are more serious, production is often more widely scattered, and industries are less closely organized. The British have no anti-trust tradition. Finally, the scarcities in Britain are different and often greater than those here.

The events leading up to concentration were much the same in both countries.

The first step toward diverting productive facilities, materials and needed skills to the war program was to limit the output of many civilian goods. Limitations vary with different industries, because some industries conflict more with the war program than others. But as between firms in each industry, limitations were usually the same, although we took more steps than the British to favor smaller firms. But as limitation cuts deeper, uniform curtailment on all plants means part-time operation of working forces as well as plant facilities. Moreover, as war production develops it not only competes more seriously with civilian production, but also the conflict is unequal in different sectors of the economy. Drafts on labor are more serious in some areas than in others. Labor cannot be moved to meet these drafts, because of lack of housing and public utility service. These cannot be greatly expanded because of the scarce materials they need. If they are not expanded, either workers fail to stay where they are needed or overcrowding threatens both health and morale.

Our only course is then to try to move civilian production out of areas of intensive war production. We may be able to do this by *concentrating the production of civilian goods in areas where there is less competition for labor between the war and civilian programs.* In much the same way the drafts on transportation and power facilities are uneven. We may then concentrate production so as to reduce the need for transportation or shift the burden on the transportation or power system to areas in which it can be more easily met.

There are three main questions about concentration which concern both industry and government. First, how should the running plants be selected? Second, what arrangements should be made to enable the closed plants to continue to provide goods to their customers? Third, what compensation, if any, should be provided to the closed plants?

Selection of the Running Plants: The number of such plants depends, of course, upon the total output of the product which we can afford during wartime, and on the capacity of the various plants to produce. Many civilian-type products are needed by the armed services and their needs are included in the total demand.

Obviously, it is very wise not to close so many plants that the remaining ones must operate at 100 per cent capacity to supply the needed output. If production is so far concentrated, any changes in the requirements of either the war, export or civilian programs may not be met until plants have been reopened, which is likely to be very difficult. A cushion of 15 or 20 per cent of unused capacity is, therefore, a necessary safeguard. When it is decided how much capacity will be needed, a list of plants must be drawn up with this capacity, these plants being the ones to remain open.

The British concentration program as originally designed relied in part on agreements between firms as to determine which plants were to close. The British government announced to industries scheduled for concentration the total permissible output and also the areas in which curtailment was most necessary. Almost invariably these areas were the ones in which there was greatest need for the release of unskilled women workers for war work. It was hoped that, on the basis of this information, the various firms in the industry would get together and "marry off."

From a paper presented before the tenth annual convention of the Institute of Cooking and Heating Appliance Manufacturers at Cincinnati, Dec. 3, 1942.

In other words, groups of two or more firms would make an arrangement between themselves for the closing of some of their plants and for the concentration of the total production quota of the group in one or more plants. This arrangement was submitted to the government. If it provided for the closing down of the necessary amount of capacity and for the freeing of the desired quantity of labor and building space in the prescribed areas, it would be accepted by the government provided certain other arrangements which I shall mention later were also made. These agreements were hardly voluntary. Firms failing to obtain nucleus certificates were warned that they would be likely to lose allocations of materials, have their labor withdrawn, and possibly their factory buildings requisitioned.

The British at first believed that by throwing the decision as to the selection of nucleus plants upon industry they would speed up the process and avoid the diversion of government effort to the settlement of industry problems.

In discussion with a number of British businessmen last August, I found that the majority now believe that the government should choose the nucleus firms. They pointed out, very properly, that the government policy required businessmen to get together to elect some of their number to commit at least temporary suicide. They believed that this decision was not of the kind that industry should be asked to take, and that the delays that have occurred were due to this fact.

Returning to this country, British experience hardly suggests reliance upon group agreements to concentrate production here. Even if this method had proved speedy and effective in England, it might be expected to encounter more difficulty here. Industry organizations are not so well developed or so universal as they are in many British industries. The size of the country and the fact that some industries are localized in a number of different areas generate conflicts of interest between subsections of the industry. Thus, learning partly from the British, and taking account of the differences in conditions in the two countries, the War Production Board has hitherto either named the plants for survival or done so indirectly by stating the rules by which a plant can decide whether it shall remain open or closed.

The selection of running plants can never be mechanical. Where an industry is highly localized, it may be difficult to choose the running plant. The release of labor, transportation and electric power may be very similar no matter which plants are closed. But the War Production Board is required by Congress under the Smaller War Plants Corporation Act to insure that small business concerns will be most effectively utilized in production of both war and essential civilian goods. Consideration, of course, will always be given to the ability of the small plants to produce the type of article needed.

Where some plants are especially equipped to turn out a type of product needed by the armed services, export or home civilian use, such plants will be selected to run unless others can be quickly adapted and at little cost in scarce materials and labor.

"Concentration will be undertaken only when there is assurance that it will aid in war production or that it is necessary to ensure essential civilian supplies. Where his assurance is lacking, there will be no concentration by the War Production Board."

But there is bound to remain an area in which the selection cannot be guided by any rule. Where production is carried on in a number of localities the problem of selecting running plants may be more difficult. Complete curtailment of civilian production in areas where labor is urgently needed for war purposes may be undesirable, because the release of labor may be obtained only at the expense of an additional burden on the transportation system. Whenever there is conflict between the various objectives of the concentration plan, the selection of running plants must be guided by the necessity of relieving our narrowest bottleneck.

This selection of nucleus plants is, of course, a very onerous duty. I discussed with a few businessmen in England the results of the government policy there. One in particular, a director of a company owning a number of cotton mills, summed up the opinion of the thoughtful businessmen. He stated that some of his mills had been closed and others remained open. He said that of course he would not have selected the same running mills as the government had selected, but he admitted that while most of his business friends disagreed in some measure with the selection by the government, they usually disagreed with each other. He concluded that the work had been done without bias and with competence, but that there was a zone in which no one could prove a particular selection to be better than any other. In short, he had no serious criticism, although he felt that his and many other businesses had been the victims of bad luck.

The second difficult problem in connection with the concentration of production is that of deciding what should happen to distribution. Manufacturers naturally ask whether the closing of their productive facilities means that they must sever their contacts with their former customers and see their trade marks disappear from the market.

The British have sought to provide that any manufacturer whose plant is closed down shall continue to receive his quota of goods from a nucleus plant if he so desires. The voluntary agreements I have mentioned frequently provide that a plant selected to run shall furnish goods to the closed firms to the full extent of the quota of each closed plant. *Every firm wishing to do so can continue in distribution on the scale permitted by its quota.* Some closed plants have their goods sent direct to their customers by the running plant; others have the goods shipped to them and deal directly with their customers. Thus, in general, the British have tried to avoid closing down the distribution activities of any firm. They have, of course, withdrawn from these distribution organizations large amounts of labor and are now reasonably sure that these distribution activities employ little or no labor that would be useful in the war program.

The British have also endeavored to avoid any unnecessary destruction of brands or trade names. *Wherever possible they permit the goods supplied to a firm with a closed plant to carry the name of that firm.* Even where virtually only utility goods may be made, as in the shoe industry, the goods supplied to closed plants carry not only the government utility mark but also the name of the closed firm or its brand.

But the government has found it impossible always to protect brand names, because such protection would require the excessive use of transportation, scarce materials or labor. In the cracker industry the government was unwilling to require the running plants to use dies bearing the name of each closed plant in the production of the crackers to be delivered to the closed plants. It was also unwilling to allocate material for the manufacture of dies bearing no firm name. Having concentrated the pro-

(*Please turn to Page* 95)

EXPLOSIONS

And their Effects

SINCE the principal means by which we hope to overcome our enemies is by explosions, the subject is of national concern.

Explosions propel naval and artillery shell; our aircraft rain 2 and 4-ton "block busters" on enemy cities and armament works; with high explosive shells we blast enemy *materiel* and personnel; aerial bombs and torpedoes send enemy ships (and, alas, a good many of our own) to the bottom of the sea.

Depth charges, land mines, hand grenades, rocket shells and small arms ammunition might be added, for they all depend for their effectiveness upon explosion.

While the dynamics of explosions are well understood in their broader aspects, our knowledge of the subject still rests largely on an experimental foundation. Certain phenomena still present difficulties of rational interpretation. Indeed the entire subject would appear to be in a comparable situation to the chemistry of the art during the five centuries antedating the close of the eighteenth century, when Cavendish and Lavoisei, by their work on combustion, provided a scientific basis for the study of the chemical reactions taking place during an explosion.

The world had, however, to wait another 50 years for the advent of what might be termed the "classical period" of invention and discovery in the explosives field—an era which marked the appearance of nitroglycerine, dynamite, blasting gelatine, guncotton and smokeless powder.

A marked distinction exists between "low" or "progressive" explosives, whose reaction rate in the chamber of a gun may be no more than a few feet per second, and "high" explosives which detonate at rates of several miles per second. These "high" explosives produce effects which are not readily calculable, partly because of our ignorance concerning the physical properties of steel and other substances at such high rates of loading.

Why, for example, will a steel shell balloon out under the slow application of internal hydraulic pressure, and shatter like a glass bottle when struck by the detonation of its high explosive charge? *And how is it possible for a short cylinder of TNT or other quick acting explosive, unaided by the interposition of any piercing device, to punch a hole in a thick steel plate by merely hollowing out a concavity in the base of the cylinder and detonating it on the surface of the plate?*

Back in 1914 there appeared in a foreign publication (*Zeitschrift fur das gesamte Schiess—und Sprengstoffwesen*) an account of hollow blasting cartridges having unusual characteristics. In this paper, the author observes that while the detonating effect of an explosive acts partly upon the material on which it rests, and partly on the medium which invests it, there may be occasions when it is desired to exert the destructive effect primarily on the solid on which it rests.

Thus, for example, we might wish to attack a foundation consisting of iron plates, girder rails, reinforced concrete and the like. In such case experience has shown that two modes of approach to the problem are available. Either we may greatly increase the surface of the explosive resting upon the body (e.g. by using a relatively squat cylinder) or we may have recourse to a discovery credited to the Westphalia-Anhalt Explosives

By ARTHUR F. MACCONOCHIE
Head, Department of Mechanical Engineering
University of Virginia
University Station, Va.
And
Contributing Editor, STEEL

"Killing" Subs

MOST effective means of destroying under water raiders, the depth charge, set to explode at any predetermined depth, depends upon hydraulic shock for its destructive effect.

The "high" explosive used in mines, bombs, torpedoes, depth charges and the like is distinguished from "low" or progressive explosives by the extreme rapidity of its reaction rate. Whereas the former "detonates" at a rate measured in *several miles per second*, the latter burns at a speed of only a *few feet per second*. Accompanying views show depth charges and their effect.

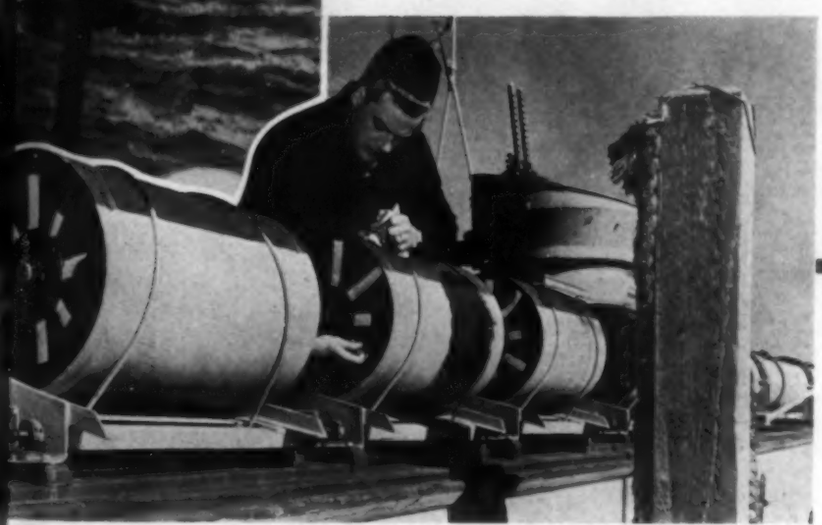
The detonating action of a high explosive is manifested first as a "water hammer" blow through the well-nigh incompressible masses of sea water which separate the depth charge from its victim. This is commonly known as the "static blow." Thereafter, the expansion of the gases generating the reaction produces a wave of rending crushing force against the hull of any submarine in the immediate vicinity, this second effect being added to that of the percussive wave in producing structural damage. These two effects can be compared to those of the chisel on one hand and the punch press on the other—the first an impact action, the second a heavy follow-through.

Even if the sub is outside the range of the crushing effect of the expanding gases, the encircling effect of the initial hydraulic hammer may suffice to disable or sink it.

Explosive compounds consist mainly of nitrated hydrocarbons, the oxygen generally being combined with the nitrogen. On exploding, the oxygen separates from the nitrogen and combines with the combustible elements present, such as carbon and hydrogen. The prime cause of the explosion is the heat given off, which is the difference between the heats of formation of the explosive itself and the products of combustion.

In high explosives a wave similar to a sound wave is propagated by means of an initial detonating agent, or perhaps by heat or mechanical shock. This transforms the solid explosive almost instantly into a gaseous mixture and a heavy blow is struck at the surrounding medium. The term "brisance" is used to denote the shattering power or force exerted by this first reaction. "Strength," on the other hand, depends upon the quantity of gas evolved and total heat generated.

Guncotton for mines and torpedoes gave way to trinitrotoluol (TNT) in the last war. Shortages of essential materials at that time led to search for new and better more powerful explosives. Out of this emerged the TNX of the United States Navy.



Co., by which the effect of the explosive is greatly increased if a cavity is made in the end of the cylinder of explosive resting on the plate to be defeated.

If reports be correct, this device enables us to blast a hole several feet deep in concrete, and one is tempted to inquire whether it might not supplant the pneumatic drill for some purposes. That such events are known to occur on the grand scale of volcanic eruptions is familiar to every geologist aware of the existence of volcanic pipes thousands of feet long and having every appearance of having been punched by a giant press.

Fig. 1, reproduced from the paper to which reference has been made above, exhibits one of the solid, cylindrical, blasting cartridges which, the author notes, are generally used for blasting purposes by pioneers. This is made by compressing picric acid or trinitrotoluol (TNT) into a cylinder 50 millimeters in diameter, 75 millimeters high and containing a small cylindrical cavity for the reception of the cap at the top. When made of TNT, such a cartridge weighs 211 grams.

If, now, a conical cavity is bored at the bottom of the cartridge as shown in Fig. 2, a large increase in the destructive effect on the plate is observed, despite the reduction of total weight to 192 grams. If a still deeper cavity is made, as shown in Fig. 3 (and the weight thereby reduced to 184 grams), a still further increase in "punching" power is noted. But the maximum effect occurs with as deep a conical cavity as it is practical to make, as shown in Fig. 4. The weight is now down to 172 grams.

Tests made with these four cartridges on a steel plate showed only a slight depression in the case of the number one (solid) cylinder. Number two exhibited a much deeper depression; while three and four blasted ragged holes (the latter considerably larger than number three). The "perforating" power as the author of the article calls it, very plainly increased with increase in the

Firing 14-Inch Guns on a Battleship

A FOURTEEN-INCH gun firing a 1400-pound projectile with a muzzle velocity of 2600 feet per second would have an angle of departure of 8 degrees 14.1 minutes at a range of 14,000 yards (roughly 8 miles). Angle of fall would be 11 degrees at this range; striking velocity approximately 1600 feet per second.

Upon impact, energy given up to the target (apart from potential energy of the explosive charge within the shell body) would be nearly 56,000,000 foot pounds—sufficient to lift a ship weighing 28,000 tons one foot. Most of this terrific energy would be dissipated on impact in punching a way through enemy armor. But the "racking" effect, especially in the case of a very heavy shell, has also been a matter of concern to ship designers endeavoring to secure maximum speed without dangerous sacrifice of protection.

Smoke from gun in this illustration consists chiefly of carbon dioxide, carbon monoxide, water vapor, nitrogen and nitrogen oxides, methane and hydrogen cyanide. Some of these gases are merely suffocating, but others are poisonous. However, condition of use of propellants promote rapid dissipation of these as opposed to fumes from high explosives which may pervade the confined spaces below decks if hit by a mine or torpedo.

Flame accompanying explosion of propellant charge in the gun is a consequence of the extremely high temperature of the reaction; but some of the poisonous gases themselves are inflammable, burning readily when mixed with the atmosphere to make a principal contribution to the total volume of flame at the muzzle. When this secondary reaction is incomplete and remnants of the explosive mixture remain in the barrel, flare-back may result upon opening the breech. Hence usual arrangements include means for expelling residual gas with a blast of compressed air.

Because of the military disadvantages of the gun's flash, efforts to suppress it are made by using substances that tend to lower the temperature of explosion, or alternatively to become dispersed through the gases as a fine dust. No ready explanation of these latter "flame suppressors" is available.

EXPLOSIONS

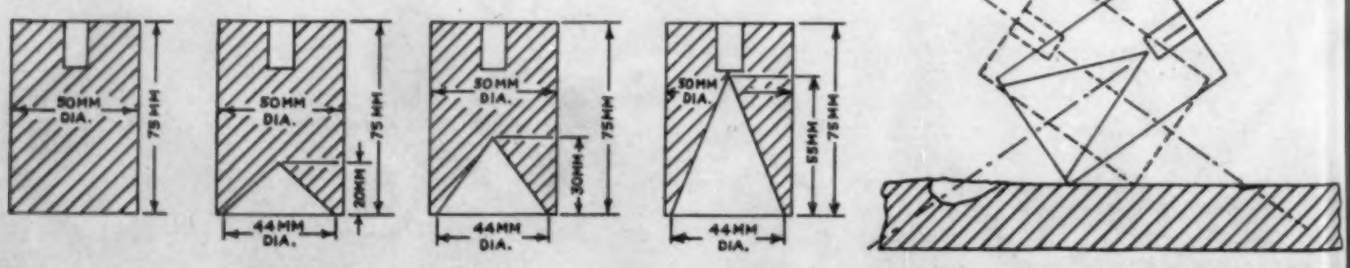
volume of the cavity in the cartridge. Indeed, he lays it down specifically, stating that the destructive effect increases with increase in the ratio of the size of the cavity to that of the cartridge—a relationship which will obviously be true only within certain limits.

Further experiments carried out with prismatic, instead of conical cavities, indicated that the form of the cavity had no influence on the final result, the same relationship between destructive effect and ratio of cavity to size of cartridge obtaining in this case also. This discovery, the author wisely remarks, "will doubtless be useful in destroying structures of every kind". He then asks, "How shall we explain the astonishingly greater effect of the hollow cartridges, in spite of the fact that they weighed less than the solid cartridges?" How, indeed!

Examination of the edges of the holes made in the steel plate by the cartridges with the largest cavities showed that the steel had been partly melted, indicating that a rush of intensely hot gas preceded the breaking through of the plate.

It also should be noted that the detonation which proceeds at extraordinary speed (rates in the order of miles per second), is initiated at the top of the cylinder and proceeds downward through each successive layer.

Thus in the case of a solid cartridge,



The Torpedo

PERHAPS the greatest menace to the Allied cause, the modern torpedo was invented by a Scotsman, Robert Whitehead, while managing an engineering factory at Fiume in 1862. Credit for the basic idea, however, belongs to an American, Robert Fulton, who demonstrated a method of destroying ships by exploding a charge of gunpowder against the hull under water as early as 1805. Lacking any means of bringing the explosive charge against the target, further development was arrested for many years. Attempts to use currents to float the torpedo to its target proved unsatisfactory.

After that the explosive was mounted on a spar projecting from the bow of a boat and immersed on approach to the ship to be sunk.

Gradually self-propelled torpedoes appeared. The Howell design embodied a heavy flywheel geared to two small screw propellers. The flywheel, having been energized by an external source of power, stored sufficient energy for the whole run.

This is the first use of gyroscopic action to guide the unit, for the heavy flywheel immediately precessed with any change of course, causing pendulum operated rudders to go into action.

Whitehead's prime contribution consisted in providing a power unit driven by compressed air. Gyroscopic controls appear to have been contributed by Ludwig Obry, an Austrian. Nowadays, compressed air is also used to blow both torpedo (and water when discharged below surface) from the tube. Shown here is a torpedo as it leaves the U.S.S. HERBERT.

Like other offensive weapons, the torpedo has encountered improved defenses in the way of nets, blisters, greater speed and maneuverability of the target. The advent of the sub with its ability to approach its victim unseen makes adequate defense extremely difficult. The fact that Allied aircraft concentrate attention on subs and their nests plainly indicates there is no totally effective method of dealing with this attack, once it has been launched. Better remedies doubtless will be found. In the meantime, success depends on our ability to build faster than torpedos destroy.

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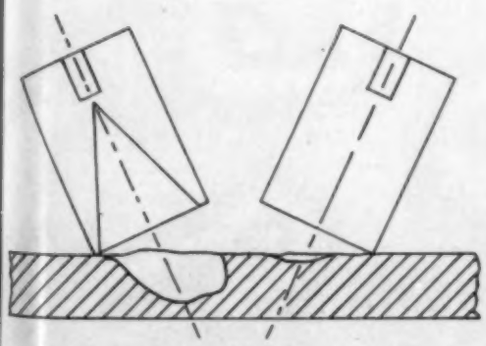
the lowest layer being the last to feel the effects of the detonating wave, serves to protect the steel plate to some extent from the action of the gases generated by the explosion of the upper part of the cartridge. That this is a highly probable assumption is borne out by the fact *cartridges of lesser diameter, even if of greater weight, exert a smaller effect than those of larger diameter.*

What, one might very well inquire, would be the effect of detonating a solid cartridge from the middle, or perhaps from the bottom?

Among the considerations which might serve to initiate an analysis of these effects, we observe that the impulse of the detonation is exerted on the steel plate on which the cartridge stands as soon as the explosive wave has reached the apex of the cavity. We might, therefore, suppose that the greater the area of explosive surface from which this effect can be transmitted without interference, the higher the intensity of the resultant pressure.

One also observes from the results of these experiments, that the action has directional characteristics, inasmuch as it is not necessary for the cartridge to rest directly on the plate to be injured or defeated, but may be at some little distance, and may have its axis inclined to the normal, as shown in Figs. 5 and 6.

These illustrations rather definitely suggest that the cartridge, especially when hollowed out in the manner de-



From Left to Right: Fig. 1—Solid cylindrical blasting cartridge of compressed picric acid or TNT

Fig. 2—Set on a plate, a cartridge with conical cavity as shown here has much more destructive effect than solid unit in Fig. 1

Fig. 3—Increasing the cavity likewise increases the destructive effect on the plate

Fig. 4—Maximum destructive effect occurs with this type cartridge although total weight of explosive has been reduced from 211 grams down to 172 grams

Fig. 5—Rough comparison of effect of solid and conical blasting cartridges on plate at acute angle. Note much deeper penetration from conical unit

Fig. 6—Conical vs. solid cartridge comparative "punching" performance is indicated here when cartridges are at an angle near the vertical

scribed, behaves like a miniature cannon.

Accustomed as we have become to the effects of explosives on structures such as buildings and ships, and in their application to quarrying and mining operations, the ability of a mass of gas to punch a hole in a steel plate comes as something of a surprise. Yet we would be willing to agree that *any* body which moves fast enough and is stopped quickly enough, may produce any given pressure; and if, coupled with this, time does not permit the familiar molecular readjustment of a bar of steel under stress in excess of the elastic limit, possibly we have all the explanation we need, or are likely to get.

As might be anticipated, the effects of explosion are enhanced if the action takes place under water, provided of course, that the greater density and inelasticity of the water is given an opportunity to produce a higher acceleration of the moving column of gas.

Many observers have noted the superior "stemming" effects of water. Berthelet (*Explosives and Their Power*—1892), for example, notes that a drop of nitrogen chloride, placed on a watch glass, will detonate without damage to the glass, but if covered with a film of water, will break it. A slight increase in the mass of the water may cause even the support to be punctured.

De Kalb, (*Manual of Explosives, Ontario Bureau of Mines*—1900) indicates the advantage of using water with dynamite in holes inclining downwards. More recently (1930), Tonegutti, using a close-fitting water-tight tin can placed in an iron cylinder so that its surface was flush with the top of the latter, demonstrated the greater effectiveness of the explosive against an iron plate 6.5-millimeters thick, when the action took place under water. L. V. Clark (U. S. Bureau of Mines—1931) using TNT in a tin container 1 inch in diameter, 3 inches high and fired by an axially located mercury-fulminate potassium-chlorate detonator, even more completely established the destructive power of underwater explosions.

Haid and Schmidt (*Zeitschrift fur das Gesamte Schiess—und Sprengstoffwesen* —1935) have some interesting observations to offer on submarine explosions and their effects.

Immediately after the detonation of a bursting charge under water, there may be observed a trembling of the surface which is most apparent when viewed directly from above. This is the result of the sudden shock caused by the violent rise in pressure in the immediate neighborhood of the focus. This sudden and violent blow produces vibrations which travel through the water after the fashion of a sound wave and with the same velocity (about 1500 meters per second). Very soon thereafter, the surface of the water above the explosive rises in the form of a dome whose base diminishes in area as the action proceeds.

Depth Determines Rise of Water

Finally, the gases themselves burst forth and a foamy mixture of gases, steam and masses of water rises high in the air and a "sheaf", consisting of light and dark masses of water shoots up, then quickly falls back again, leaving an opaque spray which soon disappears.

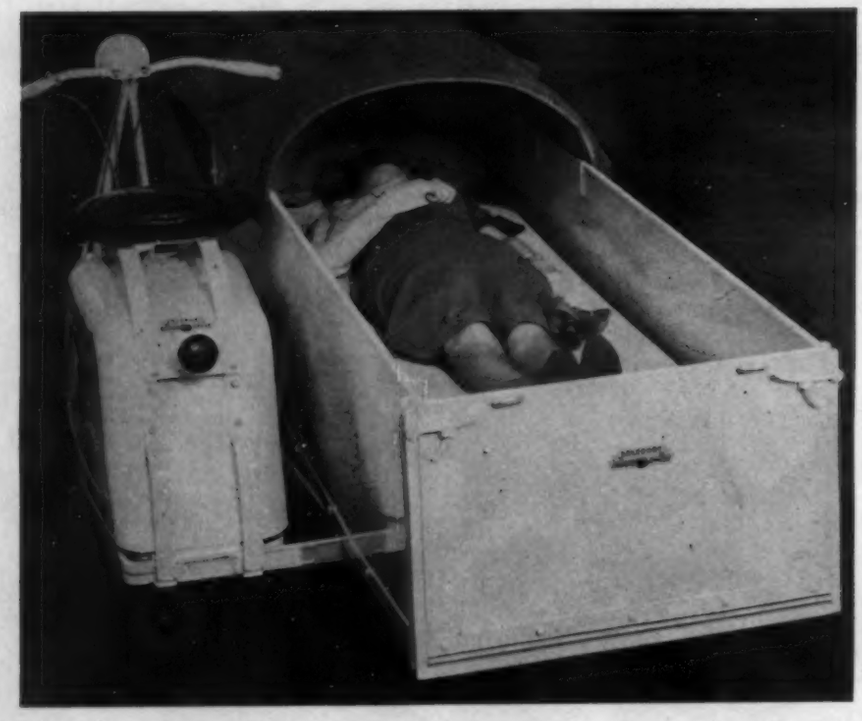
When the quantity of explosive is large, as for example in the case of a depth charge, and the depth at which detonation takes place is small, the formation of the dome and sheaf coincide. But at greater depths, the dome will already have disappeared before the sheaf shoots up. As the depth is further increased, the surface of the water merely trembles; while at great depths, the surface remains completely calm.

These phenomena may be interpreted somewhat as follows: On detonation of the explosive charge, the space occupied the moment before by the explosive is filled with gas under a pressure of from 350 *to over* 700 *tons per square inch.* It is this sudden rise in pressure which initiates the primary concussion wave. A rapid expansion of the gases of explosion follows, setting them in motion under the impulse of the most violent pressure. As might well be imagined, this expansion does not take place equally in all directions, but follows the line of least resistance which will—unless the charge is at great depth—be toward the surface. But some movement, of course, takes place laterally and toward the bottom, the latter being some 10 per cent less than in the horizontal direction.

The column of water moving upward rises in a dome, as above described, until the pendulum-like swing of the surging mass reaches the upper limit of travel and the return downward stroke commences, compressing the explosion gases in the process. At just what point in the cycle these gases burst through the surface and rise with the "sheaf" depends upon the depth of the explosive charge. If this is shallow, the sheaf may burst from the crest of the dome before it has begun to fall; whereas at greater depths, as previously indicated,

(*Please turn to Page* 78)

NOW A MONO-AMBULANCE



Powered by a scooter type Motor Glide, this ambulance is so small that it can go practically anywhere. Manufactured by B. F. McDonald Co., South Hope street, Los Angeles, it is equipped with a covered stretcher, 6 feet, 8 inches long by 26 inches wide. The Mono-Ambulance can carry three persons, the third riding back to back with the driver.

The unit features water-proof cover, automatic transmission and clutch, red and white head lights, fire extinguishing equipment and a siren.

How to reduce PRODUCTION INTERRUPTIONS caused by tools

Many busy war plants have found the answer to the problem of getting more production per machine by using the Carpenter Matched Set Method of tool steel selection. Because it provides a definite *system* for selecting the one steel that is best for each tool, this method helps to get tools that give longer *uninterrupted* production. Thousands of successful applications have proved that the Matched Set Method definitely helps to get more productive time from machines and tools.

Below are two actual production line examples of how the Carpenter Matched Set Method has helped others get increased output from present equipment.

If you are anxious to get better tool performance in *your* plant, the Carpenter Matched Set Method can help you. The two books below can help put it to work in your plant.

WANTED:— HIGHER PRODUCTION

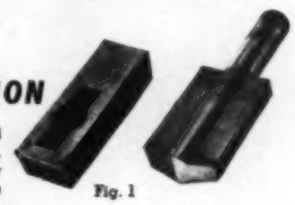


Fig. 1

JOB: Punching 3/16" thick O.H. steel sheets—19 punches and dies (Fig. 1) to the set-up. As this was a very *tough* job, the steel first tried was Carpenter's R.D.S. (Oil-Tough), toughest of the Oil-Hardening Matched Set. This gave 190,000 holes between grinds.

PROBLEM: To step up production per grind—so as to cut down shut-down time required for regrinding.

SOLUTION: Reference to the Matched Set Method indicated that greater wearing qualities could be obtained by moving north from R.D.S. to STENTOR (Oil-Hard).

RESULT: Punches and dies made from Stentor stepped up production *over 100%*—to 387,000 holes per grind. And here is an important point—while Stentor was chosen for its greater *hardness*, it also proved to have sufficient *toughness* to handle the job.

TWO JUMPS TO FIND THE ANSWER

Fig. 2

JOB: Making 3" diameter rolls used for rolling a bead on stainless strip .008" thick. Note the thin edge on the bead.

PROBLEM: When made of carbon tool steel, the thin bead cracked in hardening, so the Matched Set Method was followed to STENTOR (Oil-Hard) for "greater hardening safety." When made of Stentor, the bead stayed on in hardening safe enough, but when placed in service the strain was too much for the thin section in this hard steel, and the edges chipped.

SOLUTION: Referring again to the Matched Set Method indicated that moving south to R.D.S. (Oil-Tough) would provide greater *toughness*.

RESULT: Made of R.D.S., the rolls shown in Fig. 2 had turned out "miles" of molding when this picture was taken—and the bead is still there!

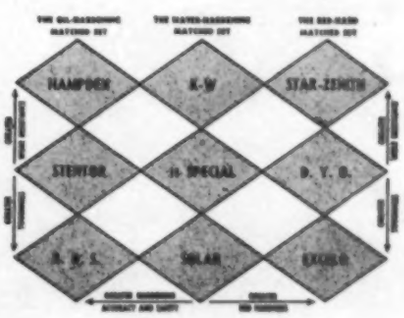
For "Refreshing" Skilled Tool Makers and Training New Men. More than 35,500 copies of this text book are now in use. Copies are available to tool steel users in the U.S.A. *at cost*, $1.00—$3.50 elsewhere.

For Tool Room Foremen and Tool Hardening. A 167-page manual with a comprehensive explanation of the Matched Set Method of Tool Steel Selection, detailed heat treating data, hardening instructions. *Free* to tool steel users in the U. S. A.

The Carpenter Steel Company 139 BERN ST., READING, PA.

Carpenter MATCHED TOOL STEELS

IMPORTANT BEFORE... VITAL NOW



Iron for Food ENRICHMENT

. . . . is produced from domestic iron by process employed in making negative active material for alkaline storage batteries. Plant utilizes effective mechanical handling aids

By GEORGE E. STRINGFELLOW
Division Manager
Storage Battery Division
Thomas A. Edison Inc.
West Orange, N. J.

FINELY DIVIDED iron-by-hydrogen for pharmaceutical purposes and food enrichment is being manufactured to United States Pharmacopoeia standards by the Edison Storage Battery Division of Thomas A. Edison Inc., by use of the process employed to make the negative active material of the alkaline storage battery. An effective materials handling system facilitates the operation.

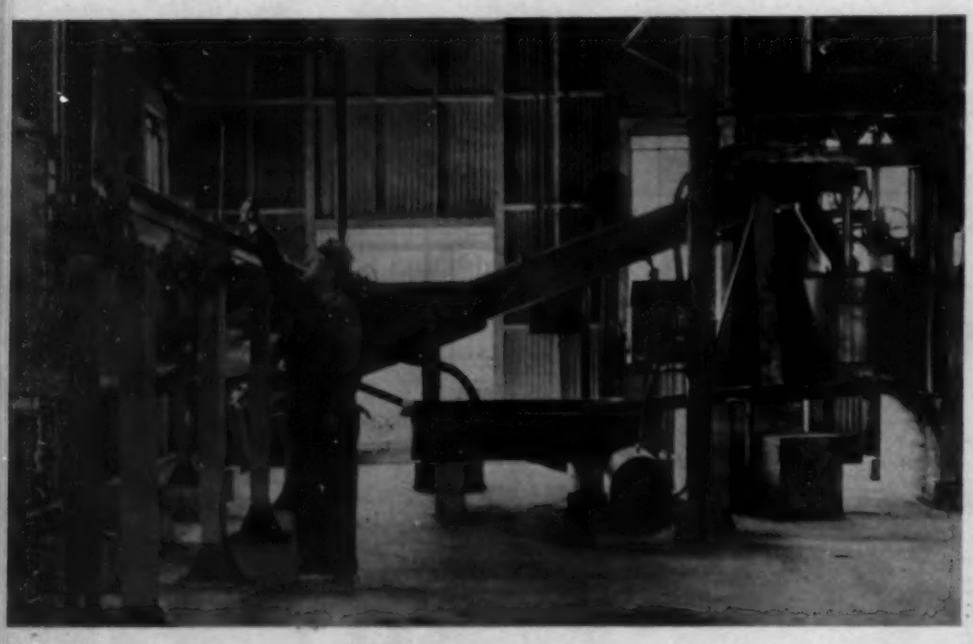
The process was originally developed by Thomas A. Edison more than 30 years ago when he was first putting the Edison alkaline storage battery into production and found that iron of the required purity was not commercially available.

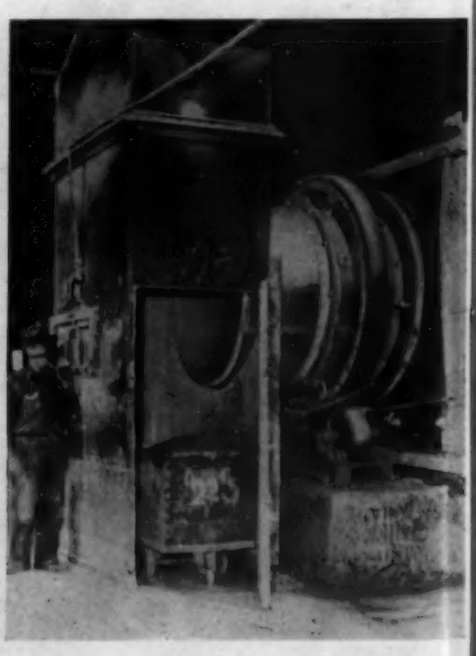
For many years, a Swedish iron was employed as the raw material; but this has now been superseded by a domestic iron which was developed as a result of a number of years of research. The domestic iron is not only an improvement over the Swedish iron but has made the process independent of foreign

Fig. 1. *(Right, above)—New 60,000-pound generator especially for production of U.S.P. reduced iron is loaded with domestic iron by overhead crane. Iron is converted to sulphate with hydrogen as a by-product, later used in the process. Solution is pumped through filters at lower right*

Fig. 2. *(Left, below)—Next step in process is to crystallize the sulphate out of solution, done here by crystallizer at left and centrifuge at right. Note enclosed conveyor for transferring the material to the centrifuge*

Fig. 3. *(Right)—Rotary driers next remove all surplus moisture from the sulphate crystals and pour them into narrow-gage railroad bucket cars for transportation to next step in process. Car is seen under outlet of drier through door that is normally closed*





PRAISE THE LORD— the Ammunition's PERFECT

Every shell hits its mark, smashing the enemy and his installations. Such accurate fire is possible only when the ammunition is correctly and uniformly made; otherwise, some shells would fall short, others over-reach the target or fail to explode. • Each shell body, shell case and fuse mechanism together have more than a score of critical dimensions. To assure uniformity, all dimensions must be checked and double checked with gages and precision gaging instruments. • Uniform ammunition, made uniform by proper Dimensional Control, assures *protective* firepower for our troops and destruction for the enemy.

Sheffield specialists in Dimensional Control perfected the MULTICHEK precision gaging instrument to simultaneously check all critical dimensions of shell cases, bodies and fuse parts, in one quick operation. One hundred per cent inspection is now both feasible and economical.

THE SHEFFIELD CORPORATION

DAYTON, OHIO, U.S.A.

Specialists in Dimensional Control

Fig. 4. (Left, above)—Dried ferrous sulphate is now roasted in muffle furnaces, coming out as red (ferric) oxide. During roasting, samples are tested for density which affords an accurate indication as to when batch is "done"

Fig. 5. (Left)—Now the red oxide is heated in sealed containers in which hydrogen is introduced. It is from this operation that the process "iron-by-hydrogen" gets its name. Here the oxide is reduced to purified metallic iron. Note the special rail car with its provision for hoisting the heavy container to furnace level and the special rails and winch on the car which enable the men to move the container into the furnace

Fig. 6. (Directly above)—Final steps consist in grinding, sifting and classifying. Iron fine enough to pass a 325-mesh screen can be produced in this setup

sources of supply.

During the first world war, when imports of pharmaceutical iron were interrupted, it was found that Edison iron-by-hydrogen met U.S.P. specifications, and a part of the production was diverted for that use. Since then, Edison iron-by-hydrogen has been used to fill most of the pharmaceutical requirements of the United States. The present war has again cut off imports of pharmaceutical iron.

In addition, use of iron for food enrichment has appeared. In flour, for example, it has been found that reduced iron can restore the natural iron content of wheat, replacing that lost in the milling process.

A substantial increase in the demand for domestically produced U.S.P. iron-by-hydrogen has thus been created and, since a more finely divided iron and a slightly different process control are required, a new plant has been built for its manufacture. It is no longer obtained by diverting part of the regular production of active material for batteries, but is now produced in separate batches expressly intended for the purpose.

Structural Steel Specifications Revised

National emergency specifications concerning the simplification of structural steel shapes are embodied in a new publication recently published by the American Iron and Steel Institute, 350 Fifth avenue, New York. Those included are in revised form having been revised for the second time in April of this year.

Simplified list of structural steel shapes given in the booklet is that referred to in paragraph b, of schedule 4 to Limitation Order L-211 of the War Production Board. Copies of the publication are available from the institute's headquarters for 25 cents each.

Offers Handbook for Welding, Cutting Operator

To instruct users of the oxy-acetylene welding and cutting process how to prolong the life of their equipment, International Acetylene Association, 30 East Forty-second street, New York, is offering a 20-page, pocket-size booklet entitled, "Handbook for the Welding and Cutting Operator."

Written in an easy-to-understand style, it contains a list of concise do's and don't's for he who wields the blowpipe, and much other helpful information and suggestions on the care and maintenance of blowpipes, regulators and welding and cutting accessories.

Publications may be obtained in reasonable quantities without charge from any manufacturer of oxygen, acetylene, carbide, or welding and cutting apparatus and supplies or the association headquarters.

One of the strangest Murders of all time

This is not a pleasant story. We are about to name the murderer in a case that has long been listed as suicide . . . and that murderer is still alive, known to many who read this story.

It happened many years ago. A man named John Fitch was supposed to have taken his own life. The truth is, he was killed — in one of the most reasonless, strange and brutal of all crimes.

He was a shabby man, who tramped through life with the frenzy of a fanatic, clutching a vision under his arm — the plans, designs and models of an invention that would revolutionize this world and bring a new era of wealth and progress to the people of his country . . . They told him that it couldn't be done.

For 15 years he shouted in a wilderness of deaf indifference, hammered at the closed doors of political thought, was branded as crazy, humiliated in public, bereft of funds, and finally killed. They say that he took an overdose of narcotic pills, but John Fitch was murdered.

He was murdered by indifference! Ignorance, stupidity and political blindness killed John Fitch — but not the vision he had offered to the world. It was the plans of a steamboat, designed, built and successfully operated 20 years before the world ever heard of the man named Robert Fulton.

We have a purpose in telling this story. It's simply this: Men are still murdered by indifference. Vision is still the victim of "It can't be done", *perhaps now more than ever before!* And because this is true, we believe that a single fact about Jones & Lamson may be important to you.

Today, the foremost engineers and designers in America are entrusting their plans and problems to Jones & Lamson for counsel, service and technical assistance in the use of precision machine tools.

If it CAN be done . . . and if tools are needed to do it . . . Jones & Lamson engineers and service men are considered among the best qualified in America to help you. Call upon them!

Universal Turret Lathes . Fay Automatic Lathes . Automatic Thread Grinders . Optical Comparators . Automatic Opening Die Heads

JONES & LAMSON MACHINE CO., SPRINGFIELD, VERMONT, U.S.A.

Profit-producing Machine Tools

WHAT IS THE FUTURE OF . . . .

Induction Heating

in heat treating, joining, forging, melting

By FRANK W. CURTIS
Chief Engineer
Van Norman Machine Tool Co.
Springfield, Mass.

WITHIN the near future, metalworking plants throughout the country, engaged in either high or low production work, will be heating metals for hardening, brazing, soldering, forging and melting by methods that their most active imagination could not have thought possible a few years ago.

High-frequency induction heat is going to offer two outstanding advantages in manufacturing techniques—an economical cost of heating metals and a high rate of production with uniform results under precise automatic control.

Induction heating units, briefly speaking, comprise a series of electrical units that convert the current of the input-line-voltage to a high-frequency current, which in turn is coupled to an inductor or heating coil. The part to be heated is placed within the coil, but does not become a part of the electrical circuit.

When power is applied to the circuit, however, heating of the workpiece begins immediately through currents high-frequency induced from the induction coil. As illustrated in Fig. 2, water passes through the induction coil when in use in order to keep it cool. The only heat generated is into the workpiece, itself. The coil is shaped to fit the contour of the work, generally with a clearance of about 3/32 to ⅛-inch.

Induction heating units for industrial applications can be either of the low or high-frequency type. The first operates at about 9600 cycles per second. The latter operates at frequencies up to about 300,000 cycles or more. The higher frequency converter has the advantage of obtaining a skin or shallow surface heating effect, which is so often desirable in connection with hardening operations. On the other hand, the low frequency units produce a more penetrating action.

With the use of high-frequency current, heat can be developed in a predetermined area of a metal part requiring localized hardening, thus eliminating the expense of heating the entire part. Likewise, the heat can be controlled to the depth desired. In heating certain types of small parts throughout, the core or center section has a tendency to heat by conduction from the outer surface which, in turn, is heated by induction.

An outstanding advantage of high-frequency heating is that parts of irregular shape, such as cams, can be heated uniformly around the surface, if the variation in contour is not too severe. For example, in hardening a gear with medium pitch teeth, the heat pattern very definitely follows the contour of the tooth so that hardening can be confined to the wearing surfaces without impairing the toughness of the inner portion.

Case hardening is a common form of heat treatment for metal parts and is, perhaps, one of the most outstanding applications for high-frequency induction hardening. Usual practice has been to heat low-carbon steel with a carbon range of 0.10 to 0.20 per cent, in containers or in a gas-charged furnace for several hours, depending upon the amount of penetration required. Finally the part is reheated and quenched in oil or water as may be needed.

From a paper presented at the annual meeting of the American Society of Tool Engineers, Milwaukee, March 27, 1943.

Fig. 1—Spur gear being induction hardened in typical fixture which includes coil of copper tubing for heating current and an outside ring with water jets for quenching in fixture—all under precise automatic control

Sometimes, this treatment is followed by a draw where a modified hardness is desired. In other cases where hardness is to be limited to certain areas of the part, it becomes necessary to remove some of the carburized section before hardening. Also the entire part may be copper plated and the plating removed from the area to be hardened before carburizing. Either method adds considerable to the cost of manufacturing.

With the induction heating process, a steel with a carbon range of 0.40 to 0.50 per cent is used. Heating is localized to the area to be hardened, without any appreciable effect on the remainder of the part. Then, the heated surface is quenched as required. Practically no scale is formed at all during heating; warpage and deformation are exceptionally slight and do not exist in most cases; drawing becomes unnecessary because the entire part has not been subjected to heat, thus precluding internal strains. Likewise, there is a substantial saving in cost, largely through the elimination of carburizing, as well as in the cost of heating for hardening. A comparison of costs for a gear on which only the teeth are required hard, Fig. 3, shows a saving of 43 per cent through use of the high-frequency induction heating method.

Cost of steel for the gear when made of SAE-1020 carburized as against SAE-1045 induction hardened was $0.40 against $0.43; cost of carburizing @ $0.039 per pound was $0.319 against zero; cost of heat to harden was $0.041 against $0.01; cost of cleaning was $0.02 against zero; total cost was $0.78 against $0.44—a saving of 43 per cent for the induction hardened part.

The analysis includes the cost of steel in both cases because this difference has a relation between carburizing and induction hardening costs. While there is only a fraction of a cent per pound difference in cost between the high and low-carbon steels, the carburizing cost runs about 0.04c per pound. The cost of heating differs, too, since only a portion of the part is heated when induction hardening is applied, and the operating cost of the unit is comparatively low.

A gear of the size shown in Fig. 3 can be hardened in about 30 seconds

FOR WAR TODAY—FOR YOUR PRODUCTS TOMORROW

DIE CAST AIR VALVES FOR TRUCK-CRANES

The die cast valve is the nerve center

One of the outstanding features of the truck-crane shown above is the air control for handling all crane and shovel movements with air clutches. Two pressure valves represent the nerve center of the control system, and each of these valves (see inset) consists principally of five zinc alloy die castings as shown at the bottom of the illustration.

The manufacturer says: "The housing is now die cast in two pieces, and the machine time has been reduced to but a fraction of the former cost. In addition, there are three other vital parts of this assembly die cast of zinc alloy, and all of these parts have shown an equal saving over the former machined method of manufacture . . . all but the simplest of machine operations have been eliminated completely."

RADIO CONNECTORS FOR WAR PLANES

A war plane with faulty radio equipment is seriously handicapped and, for this reason, precautions must be taken to insure rapid repair and maintenance. The cable plugs illustrated below (left) are employed to permit quick disconnection and connection of various radio units. The plugs fit into mating sockets in the same manner as radio tubes, and are locked in place by a few twists of the knurled bands.

The housings of each of the three sizes of connectors shown are one-piece zinc alloy die castings. The knurling and the threads are obtained in the casting operation.

These cable plugs meet army specifications

THE New Jersey zinc ALLOY POT

A publication issued for many years by The New Jersey Zinc Company to report on trends and accomplishments in the field of die castings. Title Reg. U. S. Pat. Off.

STEEL MAGAZINE EDITION No. 10

INSERTS IN ZINC ALLOY DIE CASTINGS

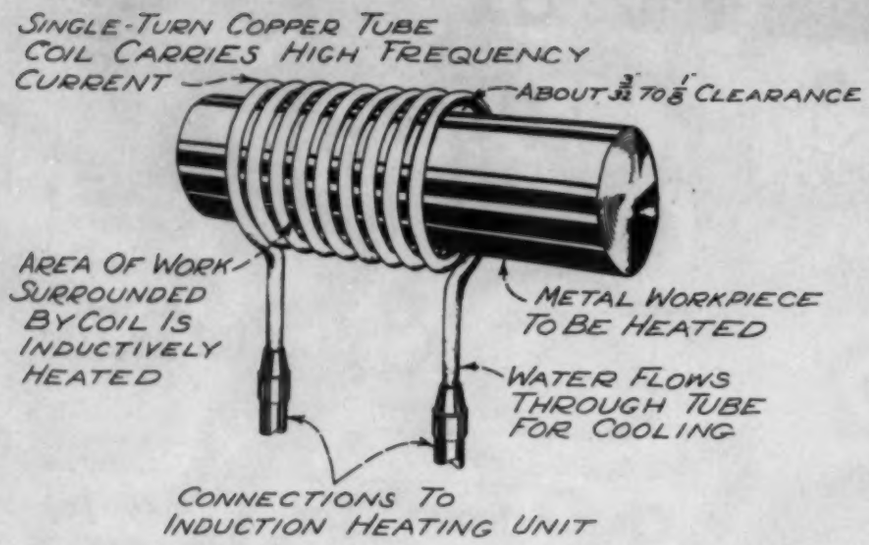
The two zinc alloy die castings used in the flywheel magneto assembly of a well known 4-cycle engine (below) provide interesting examples of the use of inserts in the die casting process. There are two magnetic pole pieces and an alloy steel permanent magnet cast as inserts in the rotating part of the ignition magneto, and the armature plate has a steel pin so cast.

Aside from electrical properties, inserts of various materials are used in zinc alloy die castings to provide superior bearing surfaces, greater hardness or wear resistance, heat and electrical insulation, ductility and other properties not possessed in the casting itself. Inserts are also used to provide passages or shapes of parts which cannot be cored.

Magnetic elements inserted in one casting—a steel pin in the other

THE NEW JERSEY ZINC COMPANY 160 FRONT ST., NEW YORK CITY

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC


SINGLE-TURN COPPER TUBE COIL CARRIES HIGH FREQUENCY CURRENT
ABOUT 3/32 TO 1/8 CLEARANCE
AREA OF WORK SURROUNDED BY COIL IS INDUCTIVELY HEATED
METAL WORKPIECE TO BE HEATED
WATER FLOWS THROUGH TUBE FOR COOLING
CONNECTIONS TO INDUCTION HEATING UNIT

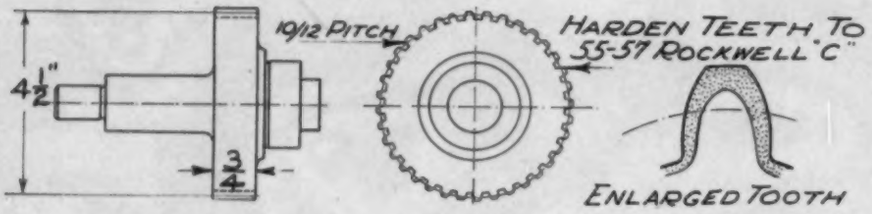


Fig. 2. (Upper view)—Showing arrangement of current carrying coil about part to be heated

Fig. 3. (Lower view)—Typical induction heat-treating job: An 8-pound intermediate gear made from SAE-1045 steel by induction hardening saves 43 per cent in cost over similar unit made from SAE 1020 by carburizing

floor-to-floor time. This includes 15 seconds for heating, 8 seconds for quenching, and the balance for loading.

Control of Hardness: Since the hardening cycle of a high-frequency heating unit is controlled by an automatic timer, it is possible to vary the hardness of a part, one way or another as may be desired, by a slight change in the heating and quenching time cycle.

Assume a shaft 2 inches in diameter is to be case hardened to a depth of 1/16-inch at one end and to a hardness of 55 rockwell C. The cycle would be to generate heat for about 10 seconds, a water quench for 6 seconds. With the timer so set, piece after piece would be produced to this hardness with no appreciable variation.

Now then, if a higher hardness were desired for the same piece, say 60 rockwell C, it could be obtained by either increasing the heat cycle slightly, say to about 11 seconds, or by increasing the pressure of the quench and duration of flow a slight amount, or perhaps both.

On the other hand if a lower hardness is desired, the lengh of quench could be reduced a second or so, or a half-second to a full-second delay could be incorporated between the end of the heat cycle and the start of the quench. If a relatively low-range hardness is required, it is possible to reduce the length of the quench materially so that the work-piece would be removed from the induction coil while still fairly hot, from which temperature it would draw itself down to the desired hardness.

To go from one extreme to the other, heating a piece without any quench would result in annealing, and heating a piece and applying a full quench would result in maximum hardness. Therefore, by varying the heat and quench cycles between these two extremes, most any range of hardness can be obtained at will.

Generally speaking, most manufacturing-type steels can be hardened by high-frequency induction heating, providing the carbon content is sufficient to produce hardness by quenching. With oil-hardening steels, provision would have to be made to drop the heated piece into oil. With water-quenching steels, a suitable holding fixture with a quench ring and an induction coil can be supplied so that the entire hardening operation is handled with the workpiece in one position. Such a fixture is shown in Fig. 1, the part being a spur gear.

(Concluded June 14)

Explosions

(Concluded from Page 70)

the dome will have disappeared before the gases break the surface.

Our prime concern with these phenomena is, of course, with their bearing on the injury done to a ship's hull by a heavy explosion in its vicinity. In brief, the intensity of the pressure resulting from the impact of moving masses of water against the plates not only depends on the distance but also on the depth of the explosion. Thus if the depth is less than the distance of the charge from the ship at the instant of detonation, water and gases will reach the surface before reaching the hull. Hence the pressure impelling the wave will already have begun to fall and may have reached a low value before impact. The damage done in this case will be slight.

Depth Determines Force

But if the depth is greater than the distance from the ship, the reverse will be true and considerable damage may be done to the structure already shaken by the pressure wave. Thus a deep mine or torpedo is more to be feared than one near the surface. Indeed the violence of the shock from such is so great on occasion as to drive the bones of men's legs through the flesh.

For any given weight of explosive, there is a particular depth at which the resultant effect is greatest. This is not a simple linear relation. Our immediate purpose may, perhaps, best be served by a few illustrations. Thus for a particular explosive, the following figures are offered:

Weight of Explosive	Depth at Which Greatest Effect Exerted
29 pounds	16.3 feet
146 pounds	32.8 feet
397 pounds	49.1 feet
830 pounds	65.6 feet

Haid and Schmidt, commenting further, indicate that their observations upon the process of formation of the dome suggest that only about one-fourth of total energy content of the explosive is available for the work of expansion of the gases. Even when the rapidity of the action is taken into account, this is not particularly surprising since the action is doubtless far from adiabatic as a result of the cooling effect of the water on the gases. See Stettbacher: "Explosionen unter Wasser—Torpedo—Wirkung" *Z. ges. Schiess, Sprengstoffw.* 25, 233-4, 1930).

If the figure of 25 per cent is in any way characteristic, the efficiency of the process is well below that of a good diesel engine but compares favorably with the overall efficiency of a modern steam power plant.

PART 7-O-X REPORTED MISSING

Jim's mother has a telegram today. It trembles in her fingers as she reads—"missing in action"... the rest is somehow blurred. Nothing now, but to wait . . . and hope.

In a war plant nearby, another telegram is read. Part 7-O-X is late. Work stops. Lacking a vital part, some jeep, plane, gun or tank may never reach in time the front where Jim was fighting.

Yes, *thousands of tiny parts* make up the war machines that kids like Jim are counting on today.

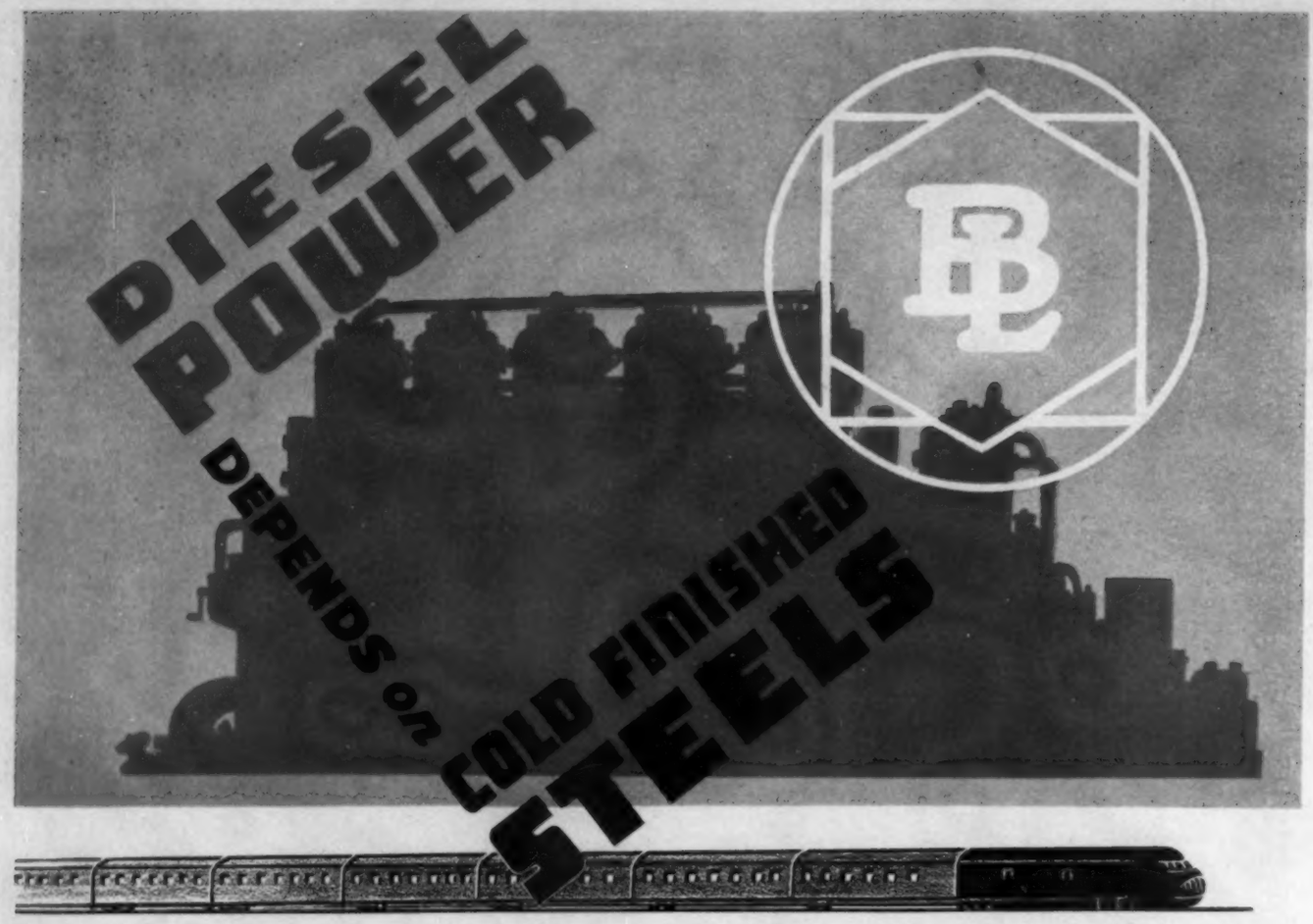
Here at R B & W, making Empire Bolts and Nuts, it's our job to make each one accurately-threaded to tighten fast and grip hard, strong to take the battering of battle, fit for the faith our fighting men must place in it. Our responsibility, too, to make it *on time,* so that no part of ours "missing in action" will mean *men* "missing in action".

You, too, may be making all-important "bits and parts" for war equipment that your workers never see. If so, this page, re-written as a poster for your plant, may help them visualize why *every part, even the smallest, counts.* Write us. The poster's free.

Russell, Burdsall & Ward Bolt and Nut Co.
Port Chester, N. Y.

RB&W *Making strong the things that make America strong*

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY



IN these critical times, men and machines are relying more and more upon Cold Finished Steels to provide the sinews of war.

The marine engines that power the deadly "PT" boats, and the streamlined locomotives that drive troop trains across the continent, are diesel powered units that require a multitude of Cold Finished Steel parts in their construction.

To give sustained effectiveness to diesel power, high quality bar steels are specified for this important purpose. For vital moving parts, exposed to severe wear and impact stress, such as piston rods, specially selected B&L grades of electric-furnace type magnaflux-tested Alloy Steels are used. For stud bolts and other stationary members, furnace-treated carbon steel bars are utilized.

In keeping with the practice of supplying the American armed forces with the hardest-hitting and best-built equipment in the world, Cold Finished Steels are "taken for granted" in specifications for high-strength, wear-resistant machine parts used in war production.

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BLISS & LAUGHLIN, INC.

HARVEY, ILL. Sales Offices in all Principal Cities BUFFALO, N.Y.

TIN SUBSTITUTES

Prove Satisfactory in Bronzes

By J. F. PELLY
And
JOHN WORTH
Bethlehem Steel Co.
Bethlehem, Pa.

FOLLOWING the receipt early in 1942 of War Production Board's Conservation Order M43A, the operating and purchasing departments of the Bethlehem Steel Co. undertook to reduce the consumption of tin in babbitts, bronzes and solders used in its plants for maintenance purposes.

As the first step, a survey was made of the alloys in use at that time. After determining the type and amount of an alloy used in a given application, the possibility of using a lower tin substitute was considered.

Tin-Bronze Bearings: In the case of bronzes containing lower tin, it was decided that an elaborate experimental program to precede any widespread use would be unnecessary because their physical properties were well known and compositions could be selected which were quite comparable in properties to the higher tin alloys.

A chart, Table I, of recommended substitutes was distributed to all of the plants. It is recognized that some of the substitute compositions are not standard with the industry and, therefore, are not readily available in ingot form. They were designed to suit conditions peculiar to our plants where we had to make the most economical use of home scrap. Of course, any of these compositions can be produced from standard commercial ingots by making the necessary additions.

In one of our plants the substitute bronzes have been in use since June 8, apparently with satisfactory results as no failures have been reported to date. We might cite one instance where the substitute material has actually given better service than the material it replaced. On the main shaft bearings of a structural mill hot saw, bearings of 85 per cent copper, 3½ tin, 5 zinc, 5 lead and 1½ nickel have lasted longer than the 90 per cent copper, 10 tin formerly used.

We are also investigating the possibilities in the use of silicon and aluminum-bronzes. However, to date we have only a few experimental installations.

Babbitt Bearings: In the past our plants have been using tin-base babbitts containing from 80 to 90 per cent tin and lead-base babbitts containing 5 to 10 per cent tin. Service tests are now being made to replace tin-base babbitt with two low-tin substitutes. One of these is an arsenic-lead-base babbitt, and the other a silver-lead-base babbitt. Their compositions are as follows: Arsenic-lead-base—12.5 per cent antimony, 0.75 tin, 3 arsenic, balance lead; silver-lead-base—10 antimony, 3 tin, 0.2 copper, 2.6 silver.

Arsenic-lead-base babbitts are under test in the following locations:

—Crank pin box on blast furnace gas blowing engines.

—Pinion boxes on 8-inch bar mill.

—Pinion boxes on 9-inch bar mill.

—Pinion boxes on 160-inch plate mill.

—Tube mill welding roll bearings.

—Main bearings on scrap preparation shears.

—Jack shaft bearings on ore transfer cars.

—Connecting rod bearings on air compressor.

—Bearings on high-speed fans.

—Bearings for general-purpose electric motors.

Silver-lead-base babbitt is being tested in a crank pin box on one of our large mill engines.

The use of these substitutes is being rapidly extended. Care should be taken not to contaminate arsenic-lead-base babbitt with tin-base babbitt. This means that all babbitt scrap must be carefully segregated. In this connection we are adopting a color code system of identification which will be applied to all bronzes and babbitts.

In the meantime, while tests are being made on the new babbitts, a major saving in tin is being effected through use of the lead-base babbitt containing only 5 per cent to 10 per cent tin wherever possible.

Solder: As the use of tin in solder is also covered in Conservation Order M43A, we have discontinued the use of solders containing over 30 per cent tin. Our tests have shown that a solder of the following composition has been found satisfactory for general purposes, including electric motor commutators: 77.75 per cent lead, 20 tin, 1.25 silver, 0.50 bismuth, 0.50 antimony. For wiping purposes, however, 70 lead, 30 tin solder is considered somewhat more satisfactory.

From *Iron & Steel Engineer.*

Table I—Recommended Substitutes for Standard Tin Bronzes

Present composition						Application	Tensile strength	Yield strength	Elongation	Brinell hardness	Substitute composition						Application	Tensile strength	Yield strength	Elongation	Brinell hardness	Remarks
Cu	Sn	Zn	Pb	Ni	P						Cu	Sn	Zn	Pb	Ni	P						
90	10	....	.....	½	0/1.00	Bearings, bushings, nuts, gears.	50,000	23,000	30	72	88	5½	4	½ Max.	2½	0/0.05	Bearings, bushings, nuts, gears, pressure castings.	42,000	17,000	32	75	Heavy duty.
.....	...	....	.....	.....	.....	....	.....	.....	.....	.....	85	3½	5	5	1½	0/0.05	... .	36,000	15,000	30	71	Light and medium duty.
80	10	....	10	. .	0/1.00	Bearings, bushings, feed nuts.	38,000	18,000	30	62	76	6	1	16	1	0/0.05	Anti-friction bearings.	29,000	16,000	18	60	Heavy duty.
.....	.....	.....	.	.	.....	... ...	.....	.....	.... .	....	85	3½	5	5	1½	0/0.05	Bearings, bushings, feed nuts.	36,000	15,000	30	71	Light and medium duty.
85	5	5	5	....	.....	Bearings, bushings, nuts, pressure castings.	34,000	15,000	32	53	85	3½	5	5	1½	0/0.05	Bearings, bushings, nuts, pressure castings.	36,000	15,000	30	71	Light and medium duty. (If higher hardness not objectionable.)
88	10	2	....	....	0/0.05	Pressure castings, bearings, nuts, gears.	45,000	19,000	30	65	88	6	4½	1½	½	0/0.05	Pressure castings, bearings.	38,000	17,000	28	55	Not suitable above 500° F. Medium duty.
88	8	4	.. .	.	0/0.05	Pressure castings, bearings, nuts, gears.	45,000	19,000	30	58	88	5½	4	½ Max.	2½	0/0.05	Bearings, pressure castings, nuts, gears	42,000	17,000	32	75	Heavy duty.
....	...	.	. .	..	.. ..	.. ..	.....	.....	. ...	....	85	5	5	5	.....	0/0.05	Bearings, pressure castings, nuts, gears	34,000	15,000	32	53	Light duty.
60	....	40	.	...	.....	Light duty application. (No wear.)	25,000	12,000	15	.....	.....	.....	.....	.....	.....	.....	....	....	.....	.....	.....	No substitute.

NOTE: All physical values are typical and should not be interpreted as minimum or maximum.

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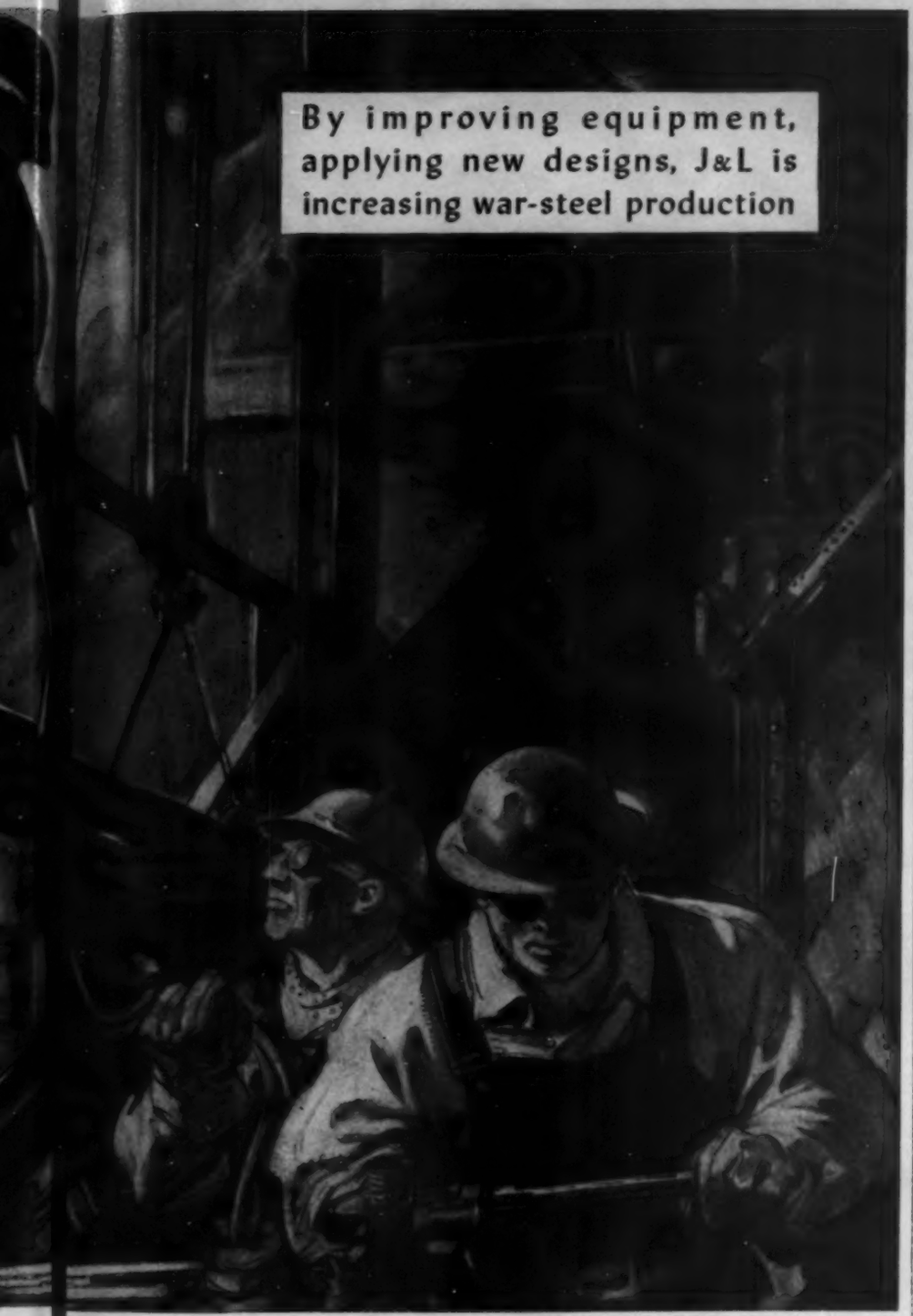
MEN OF SCIENCE AND SKILL EXPAND

On the steel front the forward lines of production are backed up by the design-engineers and draftsmen, the maintenance men and construction crews. Scores of special engineers, in cooperation with experienced steel men, design new furnaces and develop mill improvements for increasing steel production. They coordinate their plans with the on-rushing future so that at the first opportunity, essential new work can be built with minimum interference to war-steel production. In the constant glare of adjacent furnaces, hundreds of riggers, welders, carpenters, bricklayers, pipe-fitters, electricians, men of a dozen crafts and trades, are working at a fighting pace building new steel-making facilities — rebuilding and



FROM AN ORIGINAL DRAWING BY ORISON MACPHERSON

WAR-STEEL PRODUCTION

improving others. Today, more steel than ever before — 85 million tons a year — is being produced to provide our fighting men with arms and equipment to crush enemy forces and to protect our own.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH, PENNSYLVANIA
CONTROLLED QUALITY STEEL FOR WAR

J&L STEEL

MORE FIGHTING STEEL

Over billion dollars has been invested by steel industry since Hitler invaded Austria, to increase steel making capacity and to improve manufacturing equipment for production of more fighting steel. Uncle Sam is augmenting steel industry's further investments to obtain still greater capacity.

3 hours equivalent to one year is the true equation when comparing the tonnage of steel produced in three hours in U. S. A. today with the entire tonnage of iron produced in the thirteen American colonies during the year 1775. Colonial production stood at 30,000 tons annually, U. S. today has annual productive capacity of over 85,000,000 tons of steel, accounting for half the world's estimated production.

"First iron-clad boat in world" according to a resolution in Pennsylvania legislature introduced by Representative D. W. Dalrymple (R, Erie) may go to war again. Century-old lake revenue cutter constructed at Pittsburgh in 1843, at cost of $125,000, assembled and launched at Lake Erie and now resting on lake bottom, may be salvaged for scrap for the war steel industry. First commissioned the "Michigan," later named the "Wolverine," the granddaddy of modern battleships, for years on exhibition at Erie, Pa., has been allowed to sink in the mud until now called to go forth to serve her country again.

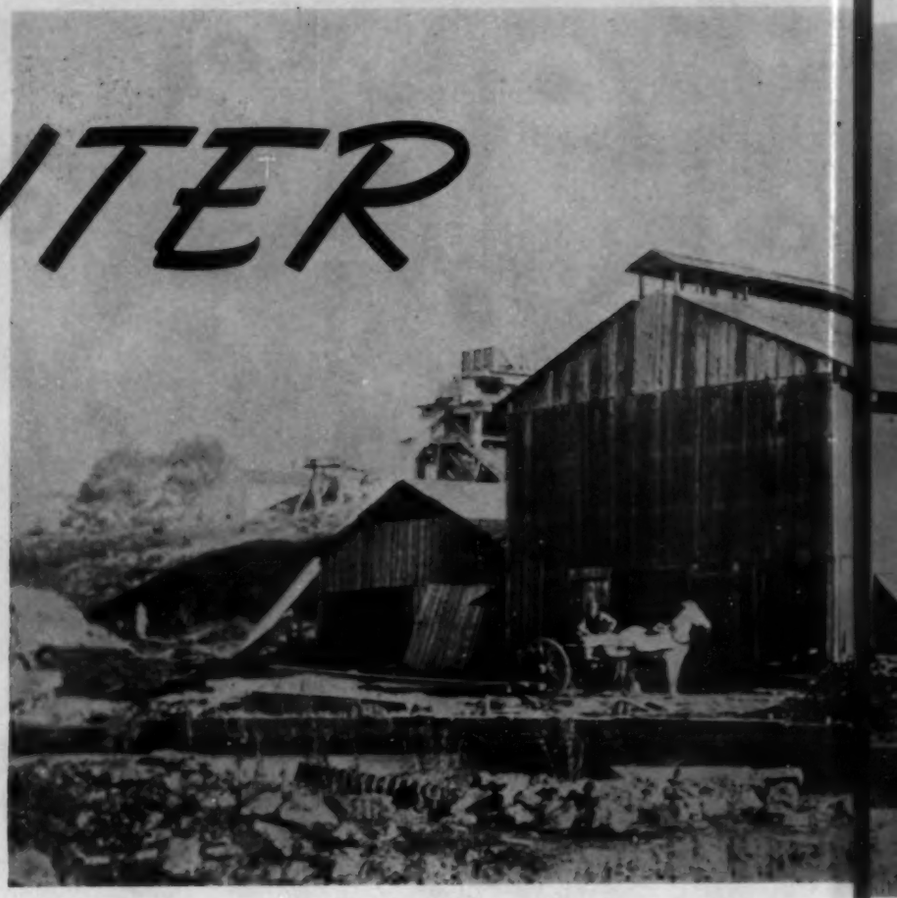
A pelican hook isn't what you may think it is: to a sailor it's just a type of quick releasing hook used where fast work is necessary.

"Weatherizing" war planes while on the assembly line, and making other equipment changes proved by combat experience to be required for the varying conditions of our theatres of war, without halting the flow of fighting ships, is a difficult Yankee achievement that may be the margin-of-victory factor in the air. Today U. S. fighters and bombers are rolling off the lines equipped to meet the icy gales of Alaska, to withstand the hot North African deserts, the excessive humidity of equatorial jungles. For lack of such a plan, U. S. aircraft men say, the Luftwaffe was defeated by cold weather on the Russian front in the 1941-42 winter.

Moving day by air is a post-war development many will be interested in if application is granted to a transfer company in Pittsburgh by the CAA to establish "an air hauling service to any place in the United States and Alaska." A part of the plan is to "serve 33 cities in Pennsylvania with air transportation of household goods, office furniture, machines and other equipment." The company proposes to start with two 5-ton cargo planes, to add two 10-ton ships and even gliders to carry a ton or two each and be cut off the air train to land at local airport.

SINTER

Its development and use



In an article entitled, "Smelting Sinter in the Blast Furnace," STEEL, Feb. 15, the author discussed the advantages of using sinter in the burden. In the accompanying treatise emphasis is placed on the economic reasons governing the trend toward the extensive use of sinter and the factors governing its economical production.
THE EDITORS

By CHARLES E. AGNEW
Consultant
Blast Furnace & Sintering Plant Operations
Cleveland

AMERICAN blast furnace industry may be divided into certain fixed eras, from Colonial days to 1850, 1850 to 1875, 1875 to 1900, and 1900 to 1943. These divisions roughly approximate the periods when certain economic forces developed which had a major effect upon the whole industry. Necessarily there was an overlapping from one era to another but in retrospect the effects of the economic changes are clear.

Few new industrial developments are undertaken from choice; they are usually forced by economic necessity. Commercial competition and expediency are the ruling forces governing the management of individual producing units within an industry and those factors are largely subject to the personal enterprise of the managements. The trend of events, which affect an entire industry, are economic factors beyond the control of the individual managements and to continue to produce competitively it is necessary for the individual managements to recognize and conform to the new economic forces. The laws governing economic pressure are slow, steady, and inexorable.

It generally is conceded that the blast furnace industry of the United States leads the world in furnace practice and design yet less than 100 years ago the stone stack, using cold blast, and producing 5 to 6 tons of iron in 24 hours was the rule, not the exception. Iron from such furnaces was graded by fracture and furnace location and was marketed from such grading and not from chemical specification. Probably the best preserved of the old furnaces is the Cornwall Furnace, at Cornwall, Pa., erected in 1742 and which produced iron until 1882. The furnace and accessory buildings are now owned and preserved by the Pennsylvania Historical Commission. The furnace is a stone stack, 30 feet high, and has a 9 foot bosh. There was comparatively little change in construction or design between the Cornwall Furnace built in 1742 and in furnaces built 100 years later.

A comparison of the old Cornwall Furnace with a modern so-called 1000-ton furnace makes one marvel at the ingenuity of man. But considering the background of knowledge available for the 1000-ton furnace construction compared available for the old furnace construction we must accord the old builders the respect which is due them. We must recognize that the period of time that the blast furnace industry has had laboratory control, is short compared to the period of time that iron was produced without such control. Perhaps furnace operators and construction engineers of the next century and beyond will look back upon the 1000-ton furnace practice and design as being rather crude.

Iron has been found in the pyramids of Egypt. Fifty centuries were needed, without laboratory control, to develop the art to produce 100 tons of iron in 24 hours from a single furnace, and in the 65 years since that accomplishment, with laboratory control, 1565 tons of iron was made each day in March by the No. 3 stack of Jones & Laughlin Steel Corp., Aliquippa, Pa., or a record total of 48,505 tons for the 31-day period.

From early colonial days until after 1850 most of the iron produced in the United States was made in the Atlantic seaboard states with eastern Pennsylvania leading all districts and in all that time there was little change in either furnace practice or design. Charcoal was the preferred fuel until 1840. Anthracite coal was first used for blast furnace fuel, in Pennsylvania, in 1838. Bituminous coke also was used in certain localities but these developments in fuel did not have any marked effect upon furnace design or upon the industry as a whole.

Iron Ores: The first major change to affect the entire industry was the discovery of the Lake Superior ores.

Sharpsville Furnace, Sharpsville, Pa., was built in 1847 by the firm of Himrod & Vincent. Later it was purchased by David and John P. Agnew and during their ownership, in 1853, the first shipment of lake ore, later known as the Jackson Mine, to be used in a blast furnace was put through the furnace. The iron was worked into nails at the Sharon Iron Co., Sharon, Pa.

Erie & Pittsburgh canal can be seen in foreground. The railroad on top of the hill came through Sharpsville about 1865. Plant buildings were rebuilt about 1870. The stone stack was replaced with a steel shell in the early 1880's.

The present Sharpsville Furnace, owned by the Pittsburgh Coke & Iron Co., occupies the site of the old stone stack.

The first shipment of Lake ore was in 1853. It involved only a few tons but it was the beginning of a major economic change which affected the entire industry and which culminated in the shipment of 93,000,000 net tons in 1942.

The era from 1853 to 1875 might be called a period of preparation for the tremendous growth which followed it. Lessons learned from the use of the soft hematite ores paved the way for the steel blast furnace shell, the higher stack, and harder blowing. Developments of this period sounded the death knell of stone stacks, and while some held on for many years there were no new ones built—a definite change in furnace design had been born.

Steelmaking Processes: Development of the bessemer and open-hearth processes for producing steel were contemporary with the development of the use of the Lake Superior ores and the rapid growth of the country furnished the demand for the iron and steel products. The combination of these circumstances provided the impetus which placed the American iron and steel industry in the position of world leadership which it has continued to hold. It might be said also that since this era began the development of the industry has been in a continual state of flux.

Coke Is Widely Used

Early in the period of the use of the Lake Superior ores bituminous coke Sinter—Its Development and Use .... proved to be the most satisfactory fuel and that discovery might be said to be responsible for the second major development which affected the entire industry because it changed the center of iron production from the Eastern Pennsylvania district to the Middle West district which was more accessible to the bituminous coal deposits of Western Pennsylvania and to the lower lake ports where the soft ores could be delivered at a low cost.

The use of the fast burning hard lump fuel with the soft earthy ores permitted the construction of larger blast furnaces. The ever-increasing demand for coke built a major industry in the Connellsville, Pa., region, with trainloads of wooden "coke racks" leaving the district daily. The larger furnaces provided the incentive and forced the development of mechanical equipment for handling and charging raw materials into the furnace and for handling molten products tapped therefrom.

The era from 1875 to 1900 saw the birth of the 400-ton furnace, the skip hoist, the double-bell top, the chill beds, and the portable iron ladles and pig casting machines. Perhaps the pronounced economic change of the era was the building of furnaces in the location most suitable for marketing the pig iron or for serving a steel plant and the transportation of raw materials from the natural source of supply to the furnaces instead of the earlier practice of building the furnaces close to the raw materials. This new departure was made possible by the assurance of reliable railroad transportation of raw materials and in return the railroads became the largest individual market for iron and steel products.

A resume of the developments in the

industry from 1853 to 1900 shows a major change in the source of raw materials, the location of producing centers, the size of producing units, and great improvements in the accessories to serve the producing units.

Since the turn of the century there has been a continual increase in the size of the furnace culminating in the 1000-ton stack and a continual improvement and refinement in the accessories to serve the stack such as, dust collecting systems, gas cleaning equipment, automatic control of gas burning, improved hot blast stoves, automatic control of furnace tops, mixer-type ladles, etc. The effect of these improvements and refinements upon the economy of the furnace operation has been that of intensifying competition between producing units.

The tendency seems to be toward the concentration of producing units in fewer hands and within certain districts which have an economic advantage of location with regard to the transportation of raw materials. Prior to World War I there were many merchant stacks, single blast furnace units, but today there are few. In World War I 459 furnaces produced 38,422,175 net tons of pig iron while in World War II the various furnaces produced 60,000,000 net tons of iron in 1942. The larger furnaces and concentration of ownership in the hands of large self-contained companies forced the majority of merchant furnaces to suspend operations. If there is any single deduction to be drawn from the foregoing review it is that the furnace plant which does not keep pace with the improvements in accessories cannot long compete with the furnace plant which does keep pace.

New Developments Recognized

The era beginning in 1900 saw the birth of an intensified interest in the chemistry of the furnace operation and the desire to recover, by beneficiation of the raw materials, some of the values which were being wasted. Examples of the kind were the by-product coke oven, the Gayley dry air process, and sintering. These developments may be said to be responsible for the third major economic change which affected the entire industry. While only the by-product oven was immediately developed and exploited the values of the other two were proven and only time and economic pressure was necessary to have those values fully recognized.

Coke Ovens: Development of the by-product coke oven was of major economic importance because it permitted the construction of the coke ovens close to the blast furnace. This changed the center of coke production from the coal mine to the furnace locations and permitted the blending of coals from widely separated sources. The revenue from the by-products provided credits which lowered the cost of coke delivered to the furnace, and permitted a uniform particle size preparation of coke which was impractical with the beehive coke because of the long railroad haul.

All of these benefits were not at first apparent. The by-product coke plant operator, justly or unjustly, was accused by the blast furnace operator of sacrificing coke quality to obtain by-products. For many years most blast furnace operators preferred beehive coke instead of by-product coke but as a better understanding of the blending of coals and the control of coking temperatures developed, by-product coke quality improved until today most blast furnace operators would object to their having to use beehive coke instead of by-product. As a result of the improvement in by-product coke quality the beehive oven is as *economically* dead as the stone blast furnace stack.

Air Conditioning: In the early days of the by-product oven the comment frequently heard was, "they could throw away the coke and still make money from the by-products." If the comment was ever true it is no longer true but it was probably close enough to the truth to retard the adoption of the dry air process as first introduced. The Gayley dry air process plants which were built proved their ability to save an appreciable amount of fuel in pounds of coke per ton of pig but the money value of those pounds of coke was not enough to justify the high installation cost of the dry air plant and the later high maintenance cost.

American industry is the marvel of the world because of mass production methods but it is also notoriously wasteful of natural resources. From the commercial viewpoint it was more profitable to sacrifice pounds of coke per ton of pig iron to obtain the by-products with which a profit could be made; the question of conservation of coal did not enter into the commercial calculation. But in recent years the money values of coke oven products have changed in relation to each other and the money value of the pounds of coke needed to produce a ton of pig iron is an important item of that production cost.

The installation cost of the modern air conditioning plants have been greatly reduced as compared to the cost of the early Gayley plants. The trend of the two extremes in the economic scale of this operation to approach each other and more exacting metallurgical demands seems to be the influence which is reviving present-day interest in air conditioning.

Sintering: The third of the raw material beneficiation methods introduced to the industry at the beginning of the present century is sintering which was introduced to salvage the furnace flue dust which was rapidly accumulating at all furnaces using the soft Lake ores, particularly those from the Mesabi range. The plants were small, designed to take care of current dust production with a portion of stock dust. With the improvements developed in blast furnace lines less dust was produced and in the course of time the stockpiles of dust were consumed; sinter has always been a minor part of most soft ore furnace operations.

With the change in the economic factors which is developing in the iron ore reserves of the country the belief now generally accepted by those engaged in the industry is that sintering is destined to play a major part in our blast furnace operations. A striking example of these changes is the movement already under way in the development and operation of magnetite ore deposits of the Eastern district by blast furnace interests with plants in the Middle West district.

As was previously mentioned the discovery and use of the Lake Superior ores moved the center of iron production from the Eastern district to the Middle West district. It is a matter of current history that production costs in the Middle West operations were so much less than the Eastern operations that in the course of time most of the Eastern furnaces were forced to suspend operations. World War I checked the movement for a time because the selling price of iron was high enough to permit the Eastern operator to ship in Lake ore and produce at a profit but with the end of the war demand and the return to normal market conditions the casualties in Eastern furnaces were high.

Imported Ores Are Used

Eastern furnaces which continued to produce tried the importation of ore from various parts of the world—Newfoundland, Sweden, Spain, Greece, Cuba, Chili, and Australia—in an effort to compete with the Middle West furnaces using the low-cost Lake Superior ores. During this period of struggle to survive on the part of Eastern furnaces the magnetite ore deposits of the Eastern district were virtually abandoned as being uneconomical because of their high smelting cost. The final solution of the problem was in the beneficiation, by concentration and sintering. The fuel rate for smelting the beneficiated product is consistently lower than that

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CRANE VALVES

necessary to smelt natural Lake Superior ores. The lesson to be learned from the experience of the Eastern district seems to be that a seemingly uneconomical ore can be prepared to be an exceptionally economical one.

It is common knowledge throughout the blast furnace industry that the ores from the Lake region have been growing leaner in iron content for some years past. Within the past year the subject has become of national interest because of the many comments in the press of the country regarding the tremendous consumption of these ores, due to war demands for metal, and the probable exhaustion of the richer deposits within a few years. The accuracy of the various predictions of time necessary to exhaust the richer deposits is not important to the subject under discussion; the important phase is that such a time is in the offing and that far-sighted management must prepare for that time when it comes.

Exhaustion of the naturally rich ores is an economic factor which is beyond the control of management. It is certain to affect the entire industry, and to continue to produce, competitively management must conform to the new economic demands. The trend of thought of those who are facing the ore problem seems definitely to be toward the concentration and sintering of the leaner ores and the prediction is offered that the industry is destined to see many refinements in the accessories to serve the known fundamentals of the present sintering process and equipment.

Use of sinter as a major part of the furnace burden still is confined to a few furnaces in the Eastern district but the desire for a greater percentage of sinter in the furnace burdens has become general in the minds of operators of other districts. In view of the fact that the annual sintering capacity of the country is estimated to be 13,000,000 net tons it is reasonable to assume that the industry has been moving in the direction of beneficiating the iron-bearing materials for some years. Sinter production probably would have continued to increase at an accelerating pace had it not been for post war planning. In this planning the increased use of sinter should be considered on its own merits but since there is no other deposit of iron ore accessible of sufficient magnitude to serve the large number of furnaces in the Middle West district, the Lake region mines must continue to do so. To utilize the leaner ores some form of beneficiation will be necessary. Concentration, blending, and sintering appear to be the logical solution of the problem.

Opinion among operators differs regarding the most advantageous percentage of sinter for the furnace burden. The opinion is offered that if the sinter is properly sized, the blowing rate properly adjusted, and full advantage taken of the ability of sinter to take high blast temperature, the closer the percentage of sinter approaches 100 per cent of the furnace burden the more economical the operation will be. The full value of sinter cannot be recognized until it is looked upon as a material of entire different physical and chemical characteristics from soft ore and to fully exploit these characteristics there must be a different conception of the rate of heat production and of the use of heat than with the soft ores. The same thought would apply to any volatile free iron-bearing material which was introduced into the furnace burden if such material became a major part of the burden.

Benefits Are Cumulative

When fully exploited the benefits from a burden of properly sized sinter are cumulative. Production will be increased and the fuel rate decreased because of the richer iron content and the heavier burden. The pig iron produced will be more uniform in chemical composition because of the more uniform absorption of heat by the stock descending through the furnace. Because of smoother furnace operation the flow of gas will be more uniform and thus beneficial to the associated operations.

Because of these advantages the trend toward the extensive use of sinter has every appearance of being directed by economic laws. Reserves of naturally rich ore are being depleted. Chemical specifications for pig iron have become more and more exacting in recent years. Use of blast furnace gas as fuel for power plants, coke ovens, and reheating furnaces demands a regularity of flow which cannot be as uniform from a burden of natural materials as from a beneficiated burden.

A resume of the past developments in the industry shows clearly that with the knowledge gained by the use of laboratory control the progress made in applying that knowledge has been directed toward the mechanical phases of the operation, the construction of larger furnaces and the equipment to serve the larger furnaces, in an effort to help the chemical reactions of the operation. The stone stack was erected adjacent to a convenient hillside. The higher furnaces required the development of the vertical hoist to fill them. When the size of the furnace was increased to the point where hand filling was inadequate the skip filling and mechanical distribution of stock solved the problem and the continued growth in the size of the furnaces simply called for a continued growth of filling equipment in like proportion.

Early in the development of modern furnace design it was discovered that as the stack became larger the fuel rate per ton of iron was reduced. The ability of the larger body of fire and the longer contact with the furnaces gases to more easily maintain the required smelting temperature, plus the increased productive capacity, provided the incentive for the ever-larger furnaces because of the lower unit cost of production. For many years as the furnace shells were enlarged it was possible to maintain parity between the hearth and top diameters with the result that as the volume of air blown was increased in proportion to the increased hearth diameter the velocity of the gas column through the top diameter was not increased because the top diameter had also been increased in the proper proportion to accommodate the increased volume of gas and the heat of the gas could be efficiently transmitted to the stock.

But with the construction of the furnaces with hearth diameters to produce 1000 net tons or more per day it proved difficult to maintain parity between the hearth and top diameters because of the excessive size and weight of the large bell and hopper and the mechanism to operate the bell. Because of these difficulties the top diameter of most of the large furnaces are smaller than the hearth diameters. It seems obvious when the volume of air blown is increased in proportion to the larger hearth the increased volume of gas must pass through the proportionately smaller top diameter with increased velocity and the opportunity for transmission of heat from the gas to the stock is lowered in proportion to the velocity of the gas. The large volume of air blown consumes coke rapidly and the flow of stock through the restricted top diameter is faster than the flow of stock through the furnaces which do not have restricted top diameters. More heat is required to prepare the fast flowing stock column but the fast flowing gas column decreases the efficiency of the transmission of heat from the gas to the stock.

This analysis seems to be a reasonable explanation of the fact that the large furnaces have not been as economical in fuel practice as they were originally expected to be. In view of the many problems which have been solved in the evolution of the blast furnace from the stone stack to the 1000-ton furnace it would be unwise to say the limit in size has been reached but the indications are

(*Please turn to Page* 102)

Answer to your *unknown sheet needs*

● Today, you probably are engaged in war work—for winning the war is the top-place duty of every American. Tomorrow?... that's another matter. Your peacetime products may change radically—and the materials you employ in fabrication may differ from those you used in the past. Your needs for tomorrow may be very uncertain, unknown today.

That's where Republic can help you. Right now, Republic is producing sheets, strip, plates and tin plate for wartime use. After the war Republic will continue in its prominent position as a supplier of a *COMPLETE* line of flat-rolled goods.

Some of those items will be new—and will enable you to increase quality and meet competition on a profitable basis. All of them will be improved through Republic's continued research and the valuable experience which is gained during wartime when urgent demand and radical change hasten new developments.

When your problem involves the selection, application or fabrication of flat-rolled steel products, you can benefit materially by bringing it to Republic.

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Export Department: Chrysler Bldg., New York, N. Y.

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TONCAN IRON
(resists rust and corrosion)

ENDURO STAINLESS STEEL
(resists corrosion and heat—lustrous and sanitary)

ELECTRO PAINTLOK
(takes paint readily—holds it)

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(long service proved by 133 years' use)

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(uniform high quality)

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FLAT ROLLED PRODUCTS

SHEETS: Hot and cold rolled—carbon, copper-bearing, alloy and stainless steel—Toncan Iron—electrical, enameling, culvert, galvanized, galvannealed, electro coated, roofing, stove, oven liners, bonderized. ● STRIP: Hot and cold rolled—coils and cut lengths—electrical, carbon, alloy and stainless steel—Toncan Iron. ● PLATES: Universal, sheared—carbon, alloy and stainless steel—Toncan Iron—light gauge. ● TIN PLATE: Coke and electrolytic—black plate and bonderized black plate—lacquered and enamel in solid colors.

TOOL BRAZING

. . . . is simplified and production speeded by electronic induction heating. New tool grinding system offers many advantages

CHIEF DETERRENT to the use of induction equipment for the brazing of carbide tools heretofore has been the lack of availability of both specialized engineering knowledge and national service facilities on such equipment. The former is now provided through the Carboloy engineering service on induction brazing of tools. As to the latter, arrangements have been concluded whereby the national service organizations of both Carboloy Co. and the General Electric Co. will co-operate in assisting manufacturers using the equipment.

The electronic induction equipment is designed for routine brazing of carbide tools using any suitable brazing medium including copper. Standardized units will be engineered to the needs of the individual plant recommendations as to size of unit or units, basic coil designs, etc., being supplied by the Carboloy engineering department on the basis of the individual user's needs.

Among the numerous advantages of induction brazing of carbide tools are:

—Greater convenience. Brazing technique is much simpler than when either furnace or torch brazing is used.

—Greater speed. Heating is confined to the actual areas desired. Time required to braze a tool is cut from minutes to seconds.

—Greater simplicity. Unskilled labor can be used to braze carbide tools with induction equipment.

—Accurate and automatic control. The amount of heat and its distribution can be controlled in electronic induction brazing as by no other method. Prevents incomplete brazes or cracking of tips due to localized overheating.

—Lower operating cost. One hundred average tools can be brazed for less than 10 cents total power cost. There are no furnaces to preheat.

—Less brazing material needed. Less flux, etc., is required in induction brazing than in other methods.

—Cleaner brazes. No scale formation. Neutral atmosphere not required even for copper brazing except when silicon-manganese steel shanks are used.

—Less maintenance. Fewer parts. No moving parts subject to wear or maintenance.

—Greater safety. While considerable power is passed through the heating coils, the nature of these high frequency currents is such that there is no danger involved in using these coils.

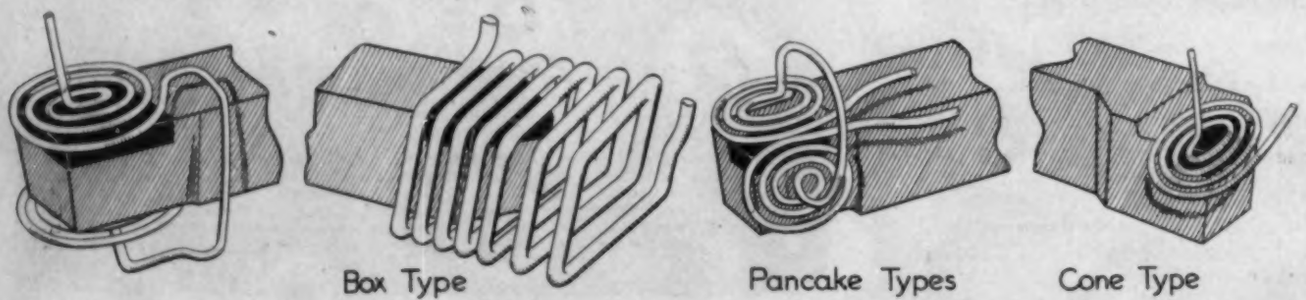
—More consistent bronzes. For a given size of tool the same dial settings with the same coils will always produce exactly the same amount and distribution of heat, insuring consistency of brazing results.

Of prime importance is the simplicity with which carbide tools can be brazed. Complete instructions as to coil types and time cycles for the usual forms of carbide tools will be furnished users by the Carboloy engineering department. With this information the operator merely attaches the correct coil for the tools to be brazed, sets the control dials on the oscillator to the proper values as to current and time, and pushes a button.

The Carboloy induction tool-brazing equipment employs a new line of general Electric high-frequency (500,000 cycle) electron tube oscillators, available in two sizes—5 and 15 kilowatts output ratings. The selection of the correct unit for any given installation is dependent on the sizes and quantities of tools to be brazed by individual users. The 15-kilowatt unit is designed to ac-

Fig. 1—Setting up the tool shank and tip for brazing. Note small induction coil just ahead of the tool tip on the small guide rails

Fig. 2—(Below)—Types of heating coil arrangements for particular joining jobs



THE SAME METHODS WILL WIN YOUR POST-WAR BATTLES

Since welding is taking such a big hand in winning the war, why shouldn't I watch it closely for ideas to win my battles for business after the war?

ALTER EGO: That's logical. Where you see welding, you see faster production and far better ships, planes, tanks and guns. The same basic methods can be used after the war to cut costs and build better autos, machines, appliances and buildings.

Can I get any ideas from the wartime gasoline tanks they're welding here?

ALTER EGO: Sure! In the first place, they're welded. And they're welded fast. Ever hear of welding 10 to 14-gauge sheet with 3/16" electrode? Usual practice requires 1/8" or 5/32" size. This shop developed fit-up jigs and positioning fixtures to allow the 3/16" size. *This bigger electrode saves them 33% in man-hours.*

Then, the big problem is not only to find ways to apply welding to my post-war products, but to find ways to beat competition on the cost of my welding.

ALTER EGO: You're right. You should use this double approach to post-war profits by keeping an eye on the big war-job welding is doing . . and by all means, ask for Lincoln cooperation on design and production.

THE LINCOLN ELECTRIC COMPANY
CLEVELAND, OHIO

then I said to myself—

THERE'S ALWAYS SOMETHING NEW UNDER THE ARC

commodate larger sizes of tools as well as the brazing of production quantities of smaller tools by brazing two or more at a time. The smaller 5-kilowatt unit is designed primarily for smaller sizes of tools.

The oscillator tubes provide a high degree of sustained accuracy of heat control. They are particularly well suited to brazing carbide tools as rapid surface heating is obtained due to the higher frequencies used.

In addition to the oscillator, the only equipment actually required to braze tools by the electron tube induction method is a table carrying a tool holder fixture or fixtures, and the necessary water-cooled coil or coils to be connected electrically to the terminals of the oscillator.

The coils are simple to fabricate and may be formed in a few minutes time from ordinary copper tubing by the user when special brazing requirements arise. Where large numbers of tools are to be brazed and the unit has sufficient capacity, it is possible to use several coils in series, so that two or more tools can be brazed simultaneously. As shown in the accompanying sketch, the coils may take a variety of forms—cylindrical, box shaped, conical, single and double "pancake", etc.—depending on the type of tool to be brazed and the distribution of heat desired.

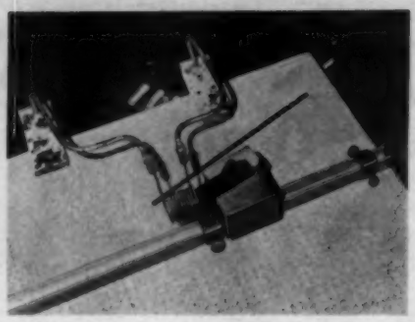


Fig. 3—Shank with tip in place and brazing compound set is moved into field of induction heating coil. A few seconds' operation joins the two parts

Experience has shown that it is not necessary to "puddle" a tip while it is being heated. It is usually only necessary to "seat it" with a rod after the current is off and the tool has been removed from the coil.

During the heating cycle, the steel shank first heats up faster than the tip due to its higher magnetic properties. Just before the correct brazing temperature is reached, however, it will be found that the carbide tip has reached a somewhat higher temperature than the shank. This is a desirable feature since maximum brazing effectiveness requires a slightly higher temperature for the carbide than the steel.

To complete preparation of the carbide tipped tool, grinding is of course a necessity. But this has been greatly facilitated by a new tool grinding principle which makes it unnecessary to employ highly skilled labor for this work. It is co-operative development by Carboloy Co. Inc., Detroit, and Edison ("Hotpoint") General Electric Co., Chicago. While as yet applied only to single purpose machines in use at the "Hotpoint" plants in Chicago, plans are going forward to develop more universal types of machines employing the same principles for general tool grinding.

The need for skilled or specially trained operators for carbide tools up to now has been due to the following:

—Sufficient pressure must be applied to the tool on the grinding wheel to grind efficiently, but not so much that the tip will overheat, resulting in thermal-cracking.

—The tool must be kept moving across the wheel to avoid localized overheating, to distribute wear on the wheel, and to obtain a good finish.

—Carbide tools must always be ground toward rather than away from the cutting edge to prevent breaking out of small particles at the cutting edge.

—Angles to which carbide tools are ground must be held closer than is the normal practice with most high speed steel tools if they are to operate at maximum efficiency and insure maximum life between grinds.

It is obvious from this that a high degree of skill is required when the control of these factors are up to the individual operator. What the new grinding process developed by Carboloy and "Hotpoint" engineers does is to remove these factors from the direct control of the operator and incorporate them in grinding equipment which automatically provides the desired motions, pressure, etc.

The development originated shortly after Edison G.E. undertook the brazing and grinding of standardized Carboloy cemented carbide tools as a subcontractor for the Carboloy Co. last year. The first machine developed was a single purpose machine to grind the top faces of standard carbide tools and relieve the serious bottleneck due to a shortage of grinder hands. With this machine, the top faces of carbide tools are ground in from 8 to 30 seconds per tool, depending on the size. Experiences indicate that a good average grinding time covering all the faces of tools produced at Edison is 25 seconds floor to floor—resulting in an output about six times that possible with a pedestal grinder on the same operation.

(*Please turn to Page* 107)

Fig. 4—Operator using new tool grinder to face top of large carbide tools at a rate of 80 to 100 per hour. The machine eliminates the human element in automatically applying correct manipulation of the tool at correct pressure

THE SWING FRAME OPERATOR
Is the Center of things these Days

★ ★ ★ THERE is an army of men in the steel mills of our country . . men whose capacity for work guarantees the quality of almost every weapon of war being produced! Steel is vital . . critical . . necessary! Upon the speed of its production depend the lives of our fighting men!

That explains why operators in your billet grinding department are speeding up. It explains why Sterling workers are turning out more than ever before . . they realize that plenty of quality grinding wheels can turn out extra amounts of work for victory.

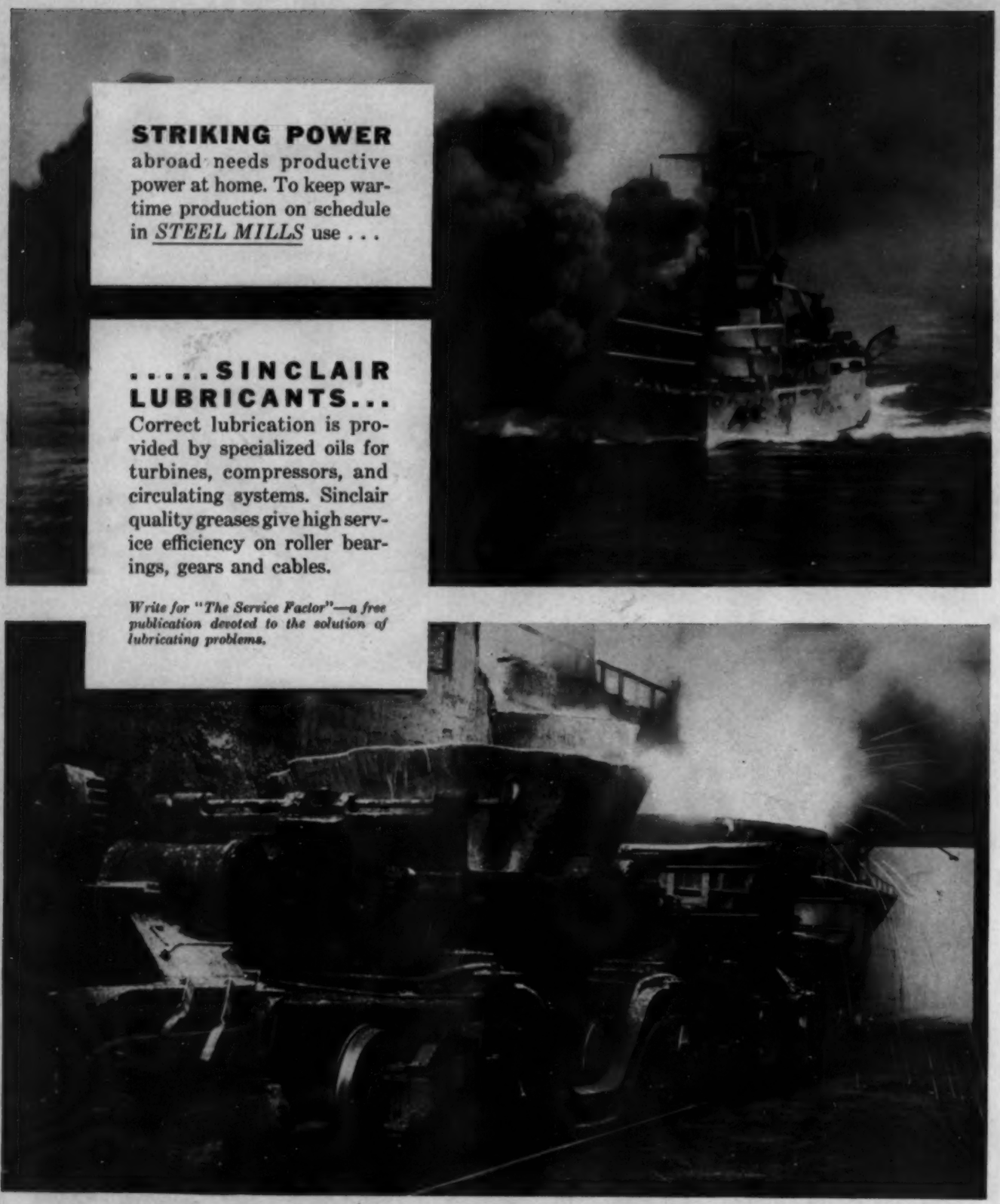
Operators and foremen like Sterling Billet Grinding Wheels. They handle easily . . turn out work faster - better! The reason is simple - the "Wheels of Industry" are built to the unusual demands of every grinding job . . grain, bond, structure, size and shape are correct for what you want them to do.

There is probably an easy way to increase production in your billet grinding department. May a Sterling engineer call?

• STERLING ABRASIVES •

THE
STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY



STRIKING POWER
abroad needs productive power at home. To keep wartime production on schedule in *STEEL MILLS* use . . .

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Concentration of Industries

(*Continued from Page 65*)

duction of soft drinks, the government has eliminated from labels all names and brands of manufacturers in order to prevent any from gaining an unfair advantage.

In this country the concentration program is too new for there to be any established policy on these matters. Nevertheless, it is clearly understood that *trade relationships will be upset only upon proof that such a step will assist the war program* and that no similar assistance can be obtained without such a disturbance. The industries thus far concentrated have not presented this problem in any acute form, but in some industries if closed plants receive no goods, certain areas may temporarily be without supplies. The War Production Board will certainly endeavor to prevent any such unequal distribution of scarce products. Furthermore, some manufacturers' distribution organizations perform valuable repair and maintenance services, and the Board has no intention of destroying these organizations except where the demands of the war program necessitate it. Essential repair and maintenance services obviously must be maintained.

Policy with regard to brand names is equally undeveloped. Bicycles are now produced in only two plants and carry no brand names, but stove manufacturers, having been limited in the materials they may use, are not prevented from placing their names on their product. The pressure of war is very likely to require the simplification of many products, and manufacturers may prefer not to have their names on these products. In some industries it may prove difficult to maintain all brands and be unfair to maintain some. In this matter the desires expressed by business will be an important guide. But the primary test in making policy with regard to supplies of goods to closed plants and with regard to brand names will always be the potential gain to the war program. Where there is no gain, no steps will be taken to change existing market organization. The War Production Board will restrict itself to those steps necessary to aid in war production and will rely as far as possible on existing business interests to adjust themselves to the changing situation.

The third major problem of concentration is in some ways the most troublesome. It is the problem of deciding whether and on what basis to provide compensation to closed plants.

The British required from the beginning of their concentration program that a running firm, as a condition of obtaining its nucleus certificate, should undertake to make reasonable compensation arrangements with closed firms. This requirement assumed that concentration would be effected in the main by the group marriages mentioned. The compensation provision would then be one of the terms in the contract. But in some of the larger industries and especially those in which the government was compelled to nominate the running firms this procedure has not been possible.

In a number of branches of the cotton textile industry the government itself set up compensation schemes. In some other industries, such as jute and pottery, trade associations established such schemes on behalf of their members. In part of the lace industry a holding company has been established to distribute profits in the same proportion as in some base year.

The general attitude of the British government is that concentration permits more economical production and that these economies should be distributed fairly between the closed and running firms. Wherever an industry group can agree on a fair basis of distribution, the government does not object. Where the government has established an industry-wide fund, it has sought some simple way of sharing the gains from concentration.

These compensation schemes raise questions as to price control and taxation upon which I can touch only briefly. In general, the British government has taken the position that when costs are being considered in connection with the setting of maximum prices, contributions for the compensation of closed plants may be included only up to the amounts necessary to provide for the care and maintenance of closed plants. This care and maintenance is not concerned with the financial preservation of existing firms but, in the main, with the physical preservation of existing plants. It is limited, therefore, to guarding the plant, caring for the machinery, keeping the buildings in repair, taxes and rent.

For purposes of taxation, payments of running firms on this care and maintenance basis are permissible as deductions in the calculation of taxable income. The receipts by closed firms from these sources are regarded as gross income. In addition, closed plants are allowed to charge depreciation on plants and machinery not in use as a result of concentration.

This compensation policy has necessarily given rise to a number of problems and some public discussion in England. It is clear that even care and maintenance of closed plants can be provided by running plants only as long as there are sufficient running plants to carry the burden. There are now one or two industries, such as carpet manufacturing, in which production is so severely cut that the few running plants cannot maintain the remainder. The British have not yet taken action on this matter.

But compensation policy in England has also been criticized more fundamentally. It has been pointed out that the financial losses of closed plants are merely one among a great variety of financial losses due to the war. These losses may be due to loss of opportunity to continue in a trade or profession, because individuals have been drafted into armed service. They may be due to property losses arising from enemy action at sea or on land. They may be due to the requisitioning of plants or the partial withdrawal of workers or materials. There is now considerable questioning as to whether these various types of losses can each be dealt with separately and according to different criteria. It is obvious that war scatters profits and losses throughout the population in a manner which depends on the peculiar needs of war. It may be that the government must endeavor to establish a policy of redistributing these losses, at least to remove most obvious types of unfairness.

On compensation policy in this country I have no authority to speak for the War Production Board. As I see it, one difficulty is that we face the problem of concentration at a time when the British, having experimented with compensation, are encountering both difficulty and criticism. Furthermore, the concentration of production in England was not attempted until the maximum of direct conversion to the war program had been achieved. Thus, practically no metal-using industries have been concentrated in England. After the fall of Dunkerque almost every industrial facility was converted that was capable of conversion.

It is, of course, unreasonable to provide special compensation if closed plants

(*Please turn to Page 103*)

Distribution . . . "In this country, the concentration program is too new for there to be any established policy on these matters. Nevertheless, it is clearly understood that trade relationships will be upset only upon proof that such a step will assist the war program and that no similar assistance can be obtained without such a disturbance."

Two men and mechanical handling aids turn out . . . .

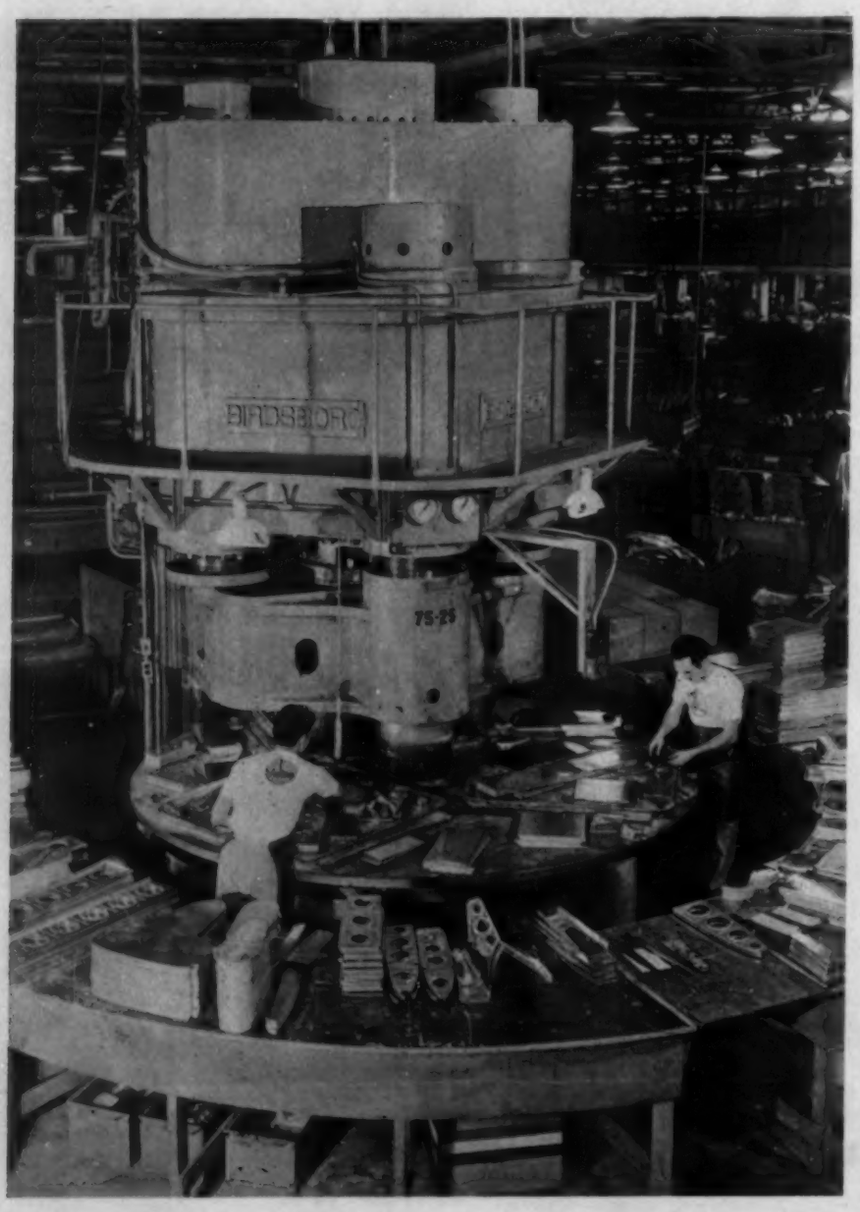
12,000 Parts Per Shift

SEVERAL months ago publicity was given to two employes of Consolidated Vultee Aircraft Corp. at the Vultee Field, Calif., division who turned out the amazing total of 10,000 miscellaneous aluminum alloy sheet metal parts in an 8-hour shift on a single, revolving table hydraulic press.

Industrial engineers at a nearby airframe plant, doubting the record, arranged to watch the press at work and during their day's inspection the two pressmen turned out a new high total of 12,666 parts.

This high production was accomplished through the ingenuity of equipment engineers who incorporated the uninterrupted-cycle principle of operation into a conventional rubber-pad press. To the 2000-ton three-column press they added a turret table, with one of the columns as its axis, as shown in the illustration.

Operator at right loads blanks on dies on press platen, trips switch which advances platen under ram and automatically actuates ram. Meanwhile other operator is removing formed parts while first operator is loading up another set. Thus press operates almost continually to reach output of 12,000 *parts per shift*



The revolving table can be indexed to either two or three stations. The two-position plates provide a working area of 68 x 40 inches with pressure of 1500 pounds per square inch. One position then can be loaded while the other is under the press. The three-position plates are 45 inches square, which boosts available pressure to 2000 pounds per square inch.

With this arrangement, one station can be used for unloading, a second for loading and the third for pressing. Under pressure, the rubber platen on the ram of the press flows evenly into all dies, male or female, and parts are formed to size and shape quickly.

Three Strokes Every 70 Seconds

Average operating speed of the press with its "merry-go-'round" fixture is three strokes every 70 seconds. As the loader pushes a button, the table revolves counter-clockwise, bringing the loaded plate to pressing position, and the stroke is made. The next actuation of the push-button repeats the cycle. The automatic positioning of the table combined with the automatic ram operation is the key to the amazing output obtained. Division of the work also aids materially for one operator does all loading and starts press, other handles the unloading. See illustration.

Some stock blanks are stacked between the plates for quick positioning. The main supply is handy to the loader, being carried on a semicircular bench outside the turret table.

Thus workmen move pieces only a short distance from bench to press platen, can unload—load quickly, keep press in almost continuous operation throughout the day.

Flue Dust Yields Rhenium In Useful Quantities

Considerable interest is being shown in the recent discovery of useful quantities of rhenium in flue dust of American steel mills, according to *Metal Powder News.*

Rhenium, a metal of high density (21.3) has a melting point in the neighborhood of 3200 degrees Cent. For this reason it is produced through reduction of potassium perrhenate as a powder, thus joining other metals applicable to powder metallurgy.

The metal resembles tungsten, molybdenum and manganese, tungsten only having the highest melting point. It is employed in the manufacture of catalysts, electrical contacts, and electrically heated filaments.

The Birdsboro patented grain roll for Roughing, Semi-Finishing and Finishing of mild, alloy, tool and special steels; non-corrosive irons and steels; non-ferrous metal bars and shapes at

LOW and HIGH TEMPERATURE ROLLING

Available in four grades--Hard, Medium, Mild and Extra Mild to meet your specific requirements. If it's a roll problem, consult Birdsboro.

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BIRDSBORO

ROLLS

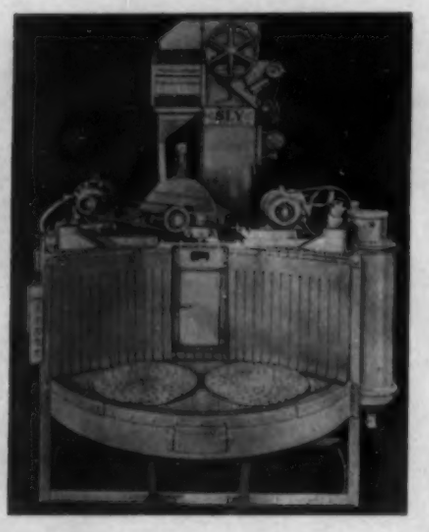
INDUSTRIAL EQUIPMENT

Blast Cleaning Machine

W. W. Sly Mfg. Co., 4702 Train avenue, Cleveland, announces a new multiple table blast cleaning machine, a high-production unit for thorough blast cleaning of large quantities of work at low cost.

An idea of what the unit looks like can be obtained by noting the accompanying illustration. The machine shown has six 30-inch diameter tables which revolve around a common axis. It may be equipped with more tables or spindles of smaller size.

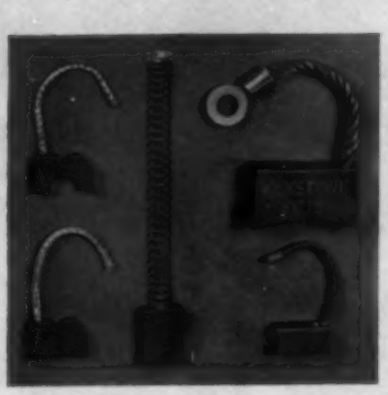
Individual pieces to be cleaned are placed on the tables. As these tables enter the blast chamber, they engage with a V-belt drive for rotation under the blast. Movement of the tables through the blast chamber is indexed and timed. Timing, as well as the rotating speed of the tables under the blast is adjustable.



The machine is furnished to accommodate work requiring a maximum clearance of 15 or 29 inches above the tables. The blast cleaning action of the unit is of the centrifugal type, generated by the Centri-Blast wheel (patented). This device is a wheel with four hard alloy blades, with no moving parts inside of the wheel, according to the company. The abrasive feed and direction of the blast is readily controlled. The used abrasive is returned to the blast wheel by a bucket elevator. Entire machine is of rugged construction and of simple design. Push-button stations are wired interlocked to assure correct starting order of motors.

Ring Brushes

Keystone Carbon Co., St. Marys, Pa., is now offering new grades of brushes for ring and commutator applications in connection with aviation and electrical industries. Accompanying illustration shows a few designs which are made in various grades of copper-graphite and silver-copper-graphite.



Certain types were developed specifically for current-control apparatus where extreme precision is vital. Shunts are molded into the brush and establish a perfect connection. Low contact drop, high current carrying capacity and a low coefficient of friction are inherent characteristics of the brushes, according to the company.

Vibratory Conveyors

Syntron Co., 370 Lexington avenue, Homer City, Pa., recently developed a line of long vibratory conveyor equipment for handling small loose material. Unit shown in the accompanying photo is a 35-foot section of a 130-foot flat pan type conveyor for handling extremely hot materials.

According to the company, the conveying action of each unit is accomplished by high-speed vibration set up by multiple, pulsating driving magnets. No mechanical moving parts such as motors, gears, bearings, eccentrics counterweights, rollers, etc., are used.

Control of the rate of flow of material through the conveyors is by rheostat from either close by or from remote point. This also can be arranged for automatic control. Trough styles are being supplied in either flat pan, as illustrated, or in sealed, tubular sections with or without multiple discharge gates at various points. Driving magnets on these units can be either below the trough, or above for clearance, and can be either floor mounted or cable suspended from above.

Gage Block Case

Savage Tool Co., Savage, Minn., announces a new improved case for Doall precision gage blocks which is only one-fourth as large as the conventional case. Although small, it holds the 81 precision gages in full view of the user.

In addition to its convenient size, the blocks are arranged for easier removal and selection. Each block is placed at a slight angle in the case so that the etched size marking near the top of each block can readily be seen at a normal viewing angle. Proper position for each block in the case is marked corresponding to the size marking on the block.

The box, constructed of kiln-dried solid walnut, measures 11 x 4½ x 2 inches. In addition it requires only a fraction of the bench space, and it can be stored in the drawer of a machinist's tool box. Convenience of handling the new box lessens hazard of dropping.

Self-Loading Truck

Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia, announces a new model K23E-6C2T self-loading and unloading truck for lifting, hauling, spotting, storing or transporting operation. It really is a combination of the company's model K23E-6C2T 6000-pound low elevating platform truck combined with a Cable King 2000-pound twin unit crane.

Electrically powered with four speeds forward and reverse this two-in-one ma-

Who's going to be the successful manufacturer TOMORROW?

YEARS ago, on the heels of those days when cast iron typified heavy machinery design in general, and crane design in particular, Northwest pioneered and proved in the field that better machinery meant lower cost operation and increased output.

Now when the pressure of the emergency is testing equipment far beyond anything that peace times ever imposed, it is the machinery that is built to do the job, not to meet a price, that is coming through.

No one knows how long the war will last, but some time there is a new day coming and the man with the best equipment is the one who is going to meet the competitive battle successfully. Northwest advantages have been proved by the fact that one out of every three Northwests sold for years has been a repeat order in the hands of leading manufacturers. You may want information for future plans. We'll be glad to give it to you. Buy War Bonds and watch Northwest.

After VICTORY Buy NORTHWEST

NORTHWEST ENGINEERING CO
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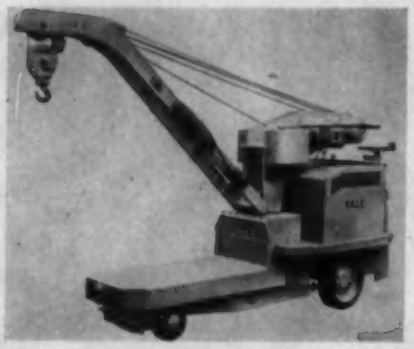
Chicago • Illinois

NORTHWEST

terials handling unit incorporates in its construction features all latest engineering advancements — compactness small over-all dimensions for maximum maneuverability in close quarters—plus —greater visibility and safety for the operator.

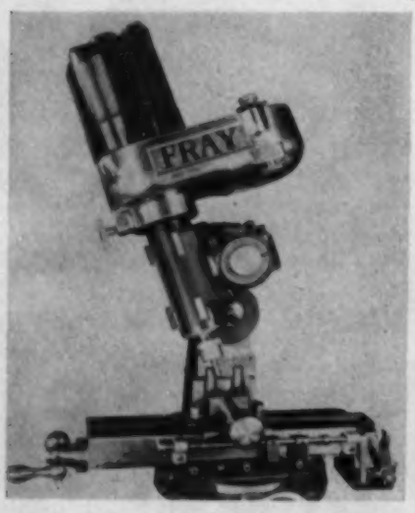
A winch unit supplies the hoisting and



booming power and both can be operated simultaneously through separate push button crane and hoist controls. Separate, independent motors and power units drive the truck for travel as well as hoist and boom the load. In addition, slewing is efficiently controlled by hand. Push button contactor controls assure accurate spotting of loads.

Milling Attachment

Fray Machine Tool Co. Inc., Glendale, Calif., is offering a new type F vertical milling attachment which handles up to ½-inch end mills in tool steel and is for



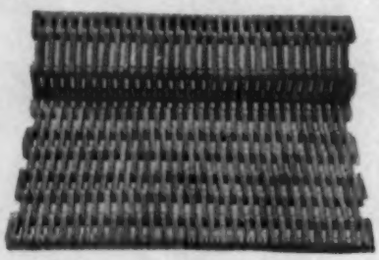
use on both bench and floor model milling machines. Its design allows cutting tools to be changed quickly.

A spanner is used to hold the spindle, while tightening and loosening collets, and a wrench for the spindle nuts. Motor bearings in the new attachment are of lifetime lubrication type, there being only one lubrication point on the entire machine. A ½-horsepower motor supplies the power.

The unit features forward, stop and reverse controls. The adjusting screw for the motor bracket is so fixed so the motor swings completely around the head. Housing and overarm adapters of the attachment are of Meehanite grey iron castings. Adequate squaring surfaces are incorporated on the spindle housing. Calibration is 30 degrees—0 degree—30 degrees on the vertical movement. The overarm is calibrated in 360 degrees. Spindle speeds for the 1750-revolutions per minute motor are 435, 650, 1170, and 3500; and for the 3500-revolutions per minute motor—870, 1300, 2340 and 7000.

Safety Mats

Industrial Products Co., 2820 North Fourth street, Philadelphia, announces a Tuf-Link safety mat composed of rubber composition links held together by wire



rods, for use in front of lathes and other machines. It is reported to be idea. for workers who must stand throughout the day, relieving foot soreness, leg and back strain. The mats can easily be rolled up in order to clean the floor.

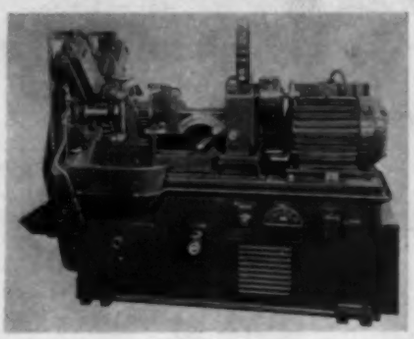
Spotfacing Machine

Snyder Tool & Engineering Co., Detroit, is offering a new multiple spindle hydraulic back spotfacing machine designed especially to back spotface at one time the entire set of bolt holes in the cylinder barrel flange of certain types of aircraft engines.

In operation, the cylinder head assembly is loaded in a horizontal position and clamped manually in place on a sliding fixture. After the part is clamped in place, the cutters are brought into correct working position and then the multiple spindle driving head is advanced manually so that the drivers pass through the bolt holes and engage the cutting tools for spotfacing.

While the drivers are rotated manually to reach full engagement with the cutting tools, it is not necessary for the operator to touch the cutting tools. A safety device behind each driver prevents operator from starting operation until all drivers are fully engaged.

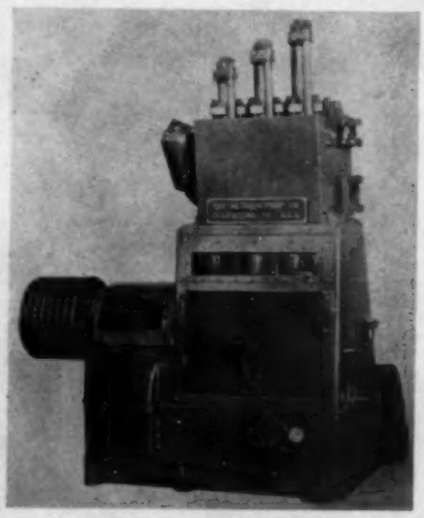
With drivers and tools fully engaged, the machine is ready for its working



cycle. This consists of rotating the tools under power and feeding the cylinder head against the cutters. When the full depth of cut has been made, the tools dwell in the work momentarily to assure a smooth machined surface. The base of the machine contains coolant as well as the hydraulic tank and piping.

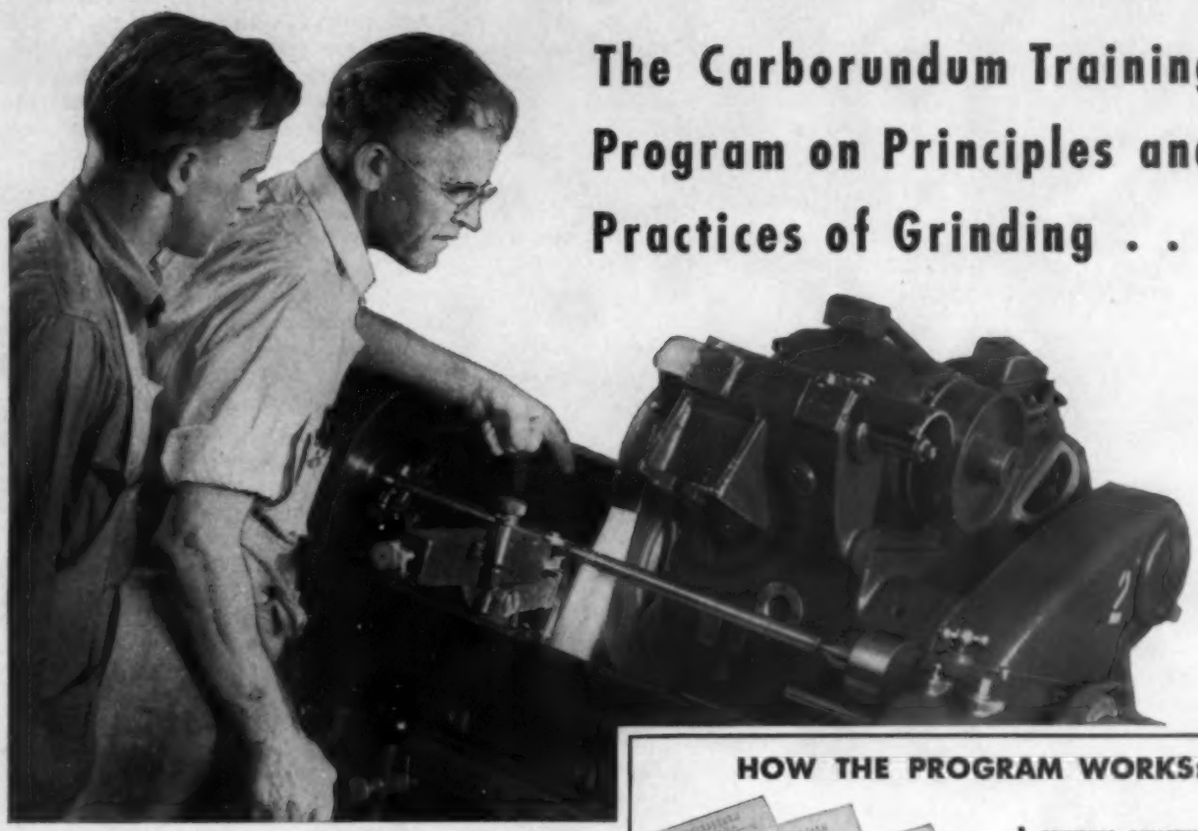
Triplex Pumps

Aldrich Pump Co., Allentown, Pa., is offering a new inverted vertical triplex pump with new drive arrangement, design of which provides for built-in pump gearing with extended pinion shaft, allowing for direct connection through



flexible coupling to motor, or for V-belt drive to prime mover. It is now being supplied with any of three drive arrangements—direct to gear-head motor, through chain, flat or V-belt drive from extended crankshaft to prime mover, and through built-in pump gearing.

FREE! FOR TRAINEES IN INDUSTRY!



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THE problem of training green workers for precision war work is one of the biggest jobs industry has ever tackled.

Here is our contribution to its solution—a streamlined course in the principles and practices of grinding, offered to trainees in *your* Plant!

The purpose of the Carborundum Training Program is to explain in simple, non-technical terms the fundamentals of grinding and thereby help make better grinder hands of trainees, apprentices and students.

This course is designed for both classroom and small group instruction. Since its introduction, it has been widely adopted throughout industry. We hope it may help you, as it is helping others, to simplify the training of new grinder hands and to speed them on their way to higher production and greater accuracy.

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2. BOUND VOLUMES. A limited number of bound Grinding Bulletins are available for instruction as well as for placement in your classroom or technical library for reference purposes.

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☐ With _____ instructors assigned.
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☐ With adequate classroom facilities

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Title.....

Company.....

City and State.....

Sinter Development

(*Continued from Page 88*)

that benefits in fuel economy to be gained from increase in size of the furnace alone have been reached.

We have then three important factors of the operation pointing to the use of beneficiated materials in the furnace burden if further progress is to be made;

1.—Greater tonnage and lower fuel rate from an existing producing unit.
2.—Exacting metallurgical demands which require greater uniformity in chemical composition and the control of quantity production within closer chemical specifications.
3.—Possible economical limit in size of furnace using natural materials. It is conceivable that the structural strength of sinter would permit the construction of a higher furnace and the longer contact with the furnace gas could lower the fuel rate.

If the foregoing analysis is correct the blast furnace industry is on the threshold of a new era which will see a tremendous advancement in the use of beneficiated iron-bearing materials. Since the ores from the Lake regions must continue to supply most of the furnaces of the Middle West district an attempt will be made to analyze the economics of sinter production from those ores.

In past years one of the principal advantages possessed by Lake ores was the low mining cost. Open pit and steam shovel mining encouraged the development of equipment to handle the ore in large volume. The natural high iron content of the ores made their use in the blast furnace burden economical. But with the march of time many changes have taken place. For years many of the ores have been partially beneficiated by washing. The natural iron content gradually has lessened and recognized authorities agree that future years are certain to force the use of leaner deposits which heretofore have been undisturbed. These changes are certain to increase the cost of a unit of iron delivered to lower lake ports unless the iron content can be concentrated to a percentage of content which will lower the delivery charge per unit of iron enough to offset the concentration cost. If this sounds like an impossibility let it be remembered that some Eastern ore mines regularly mine 2½ to 3 tons of ore to get 1 ton of concentrate, and do it profitably.

In retrospect, the basic economic law which has had the greatest continued influence upon the industry is that affecting the transportation of raw materials. In early days the furnace was built beside the ore deposit and in those days ore deposit usually was found near an ample wood supply from which charcoal was produced close to the furnace. In Eastern Pennsylvania the change from charcoal to anthracite coal did not change the practice greatly because anthracite coal deposits were close to the native ore deposits. It has been shown how the use of bituminous coke and the discovery of the Lake ores moved the center of iron production from Eastern Pennsylvania to the Middle West district. The combination of the long low-cost water transportation for the ore, which handling could not hurt, the short railroad haul for the fragile beehive coke, and the close proximity to the rapidly developing middle west market served to center the iron and steel industry in the Pittsburgh district.

Development of the by-product coke oven permitted the long haul of coal without injury to it and there was a movement of furnace development to the lower Lake ports. In a sense that movement was a trend toward moving the furnace back to the ore deposit or at least approaching it as closely as was practical in relation to the market for the iron product. The essence of that transition seems to be to transport the bulky raw materials a minimum of ton-miles consistent with the effect of transportation upon the raw materials.

Recommends Concentration at Mines

In considering the concentration and sintering of large tonnages of Lake ore it is obvious that when concentration is possible it should be done at the mine. There is a school of thought favorable to sintering at the mine also but that practice would have some disadvantages. Fuel for sintering would have to be transported to the mine and there would not be any opportunity of blending the concentrate with the concentrate from some other mine without a cross railroad movement. But if the ore is concentrated at the mine and the concentrate shipped to the loading port any number of concentrates could be blended into a sinter mix without any cross railroad haul.

If the iron in one ore is so finely disseminated that it cannot be highly concentrated, it could be blended at the loading port with a highly concentrated ore; the blended sinter product then would be desirable. This blending could be done at the loading port providing it is economical to ship both ores to the same loading port.

Physical characteristics of the product are worthy of serious thought when contemplating the sintering of large tonnages at the mines or upper lake ports. The structural strength of sinter makes it an abrasive material. It seems reasonable to say if any appreciable part of the tonnage of ore brought down the lakes was sinter the abrasive wear upon loading chutes at the loading docks, boat bottoms, and the unloading equipment at lower lake docks would be considerably more than with the soft ore. Against this fact would be the opportunity to use self-unloading boats which would shorten the unloading time and lessen the maintenance of equipment at lower lake docks.

If the ores were concentrated at the mines and the concentrates shipped to the lower lake ports for sintering, the concentrates from any mine location or from any loading port could be brought together at the lower lake port without affecting the transportation charges. For the lower lake port furnaces that arrangement would bring the sintering plant and the furnace together, an arrangement which has many advantages. For the inland furnace the concentrates could be blended and sintered at the lower lake ports and the sintered product shipped. The saving in railroad freight charges with such an arrangement would be considerable. Using 10 per cent moisture and 5 per cent volatile matter as representative of a lake ore and assuming 40,000,000 net tons of ore are subjected to rail movement during a season a saving in freight on 6,000,000 tons of volatile matter is indicated.

The location of the sintering plant at the blast furnace has some of the same advantages as locating the by-product coke plant at the furnace. Iron-bearing materials from widely separated sources can be brought together and blended into a uniform product. Particle size of the sinter is more easily controlled to the best advantage of the furnace operation. Sinter can be produced as needed, while stocking sinter does not have any injurious effect upon it the abrasive action of sinter upon handling equipment makes it desirable to avoid as much secondary handling as possible. From the viewpoint of maintenance it seems desirable to use sinter with one handling.

In 1853 it would have taken a bold man, had he watched the transfer of the few tons of ore from a sailing vessel to a canal boat, at Erie, Pa., to predict the day when cargoes of 6000 to 15,000 tons of ore would be brought down the lakes in boats especially built for the purpose and unloaded at docks built and equipped to unload such cargoes in a few hours. But with those achievements accomplished facts it does not seem unreasonable to predict the day when the greater part of iron-bearing material for blast furnace use will be beneficiated, and the operators of the future will look back to the time when natural materials were used much as the operator looks back to cold blast.

(*Continued Next Week*)

Concentration of Industries

(*Continued from Page* 95)

can avoid loss by participating in the war program. Yet, it is somewhat difficult to know when firms are unable to participate in the war program, as some businesses have ventured into completely new fields in order to participate. In some industries where firms have a number of plants, they can arrange for their own compensation better than the government can arrange it for them. Nevertheless, there remain industries in which there will be severe hardship. But these hardships are a part of the much larger problem of distributing war losses which faces Congress.

Concentration Reduces Transportation

There are certain other adjustments which have been made in England at the same time as concentration and sometimes as part of the concentration. The principal of these are the control of transportation and the simplification of products.

Production can often be concentrated in ways that reduce the transportation burden, although, as I have mentioned, we must sometimes choose between the release of workers, or other resources in areas in which they are most needed and the release of transportation facilities. But concentration does not necessarily affect all the possible economies in transportation. In consequence in England, the Ministry of Food, which is responsible for concentration in the food industry, has also controlled the market areas of some industries.

For example, the areas over which candy, crackers and soft drinks can be distributed from certain production points are now regulated. The British have also begun to curtail the production of soft drinks but are proposing to increase the supply of concentrates as a means of reducing transportation. The food authorities in England have also taken steps to zone the distribution of certain fresh fruits, vegetables and fish.

Transportation shortages are already with us in the United States. The production of freight cars and locomotives requires very large quantities of steel, and also facilities of first importance in the war program. It may not be possible to provide the railroads with all the equipment necessary to handle all the freight that may be offered to them. Our only alternative is to regulate the goods that may be carried. The first and most necessary step is to reduce transportation where the reduction can be made without reducing the volume of goods available to consumers. As you know, steps have already been taken to zone the distribution of sugar and to pool transportation, storage and distribution

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AN AERIAL CAMERA may not seem like a front line weapon—but with these precise instruments our Army Intelligence is really "getting the drop" on our enemies: spying out big gun emplacements, ammunition depots, harbor facilities . . . and learning plenty about the enemy's dispositions *before* our bombers or troops move in for the kill.

• Flat wire for aerial camera parts must meet tough specifications, for these eyes of the army have to operate perfectly and precisely at temperatures ranging from 110° at sea level down to −50° at high altitude! Roebling flat wire for optical parts is meeting such tough specifications *consistently* . . . providing a "special" in terms of temper, or dimensions, or steel quality that exactly fills the bill on a difficult job.

Is wire supply one of your war-production problems? Let Roebling help you "get the drop" on it with the skill, experience and facilities that have solved so many wire problems.

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The advanced equipment we now offer is our answer to that need. By adding this new line of machines to our airless blast and airblast equipment, we are now the only manufacturer to offer *a complete metal cleaning engineering service.*

The new American metal washing machines include standard batch type mills and special machines for removing chips, dirt, grease, and oil from machined parts, stampings, screw machine products, etc.

High pressure sprays are used—and the equipment is designed for solvent emulsion degreasing or alkali cleaning and hot air drying. Various designs are available to include washing, rinsing, drying, and rust proofing.

Tell us about your metal cleaning problem—we will be glad to help you in every possible way.

A NEW WAY

To Wash Metal Parts

The Tumbl-Spray Metal Washing Machine, described in this bulletin, cuts cleaning time and costs and does a better job, because the work is quickly and completely exposed to the sprays by means of an exclusive AMERICAN endless belt conveyor, as illustrated.

Write for Bulletin No. 9

Tumbl-Spray Cleaning chamber, which gently cascades and completely exposes the parts to the cleaning sprays.

Conveyor-Spray Machine to Wash, Rinse, and Dry Miscellaneous Work. The machine is composed of units which can be expanded to suit variations in production set ups. Many other models available.

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facilities in the petroleum industry.

The simplification and standardization of products is not only a necessity as the demands of war increase, it is also sometimes a means of facilitating the concentration of production. The British have found that when materials for civilian products become scarce it is necessary for the government to insure that these materials are used in the most economical way.

By paring the product down to its bare essentials the government imposes sacrifice on consumers, but less sacrifice than if fewer units of a more elaborate product were made. But the drive to simplify products in England has been almost as much influenced by the intense shortage of labor as by the shortage of materials.

Finally, the British have found that prices cannot be effectively controlled unless products are clearly defined. The British have therefore developed a number of "utility" articles. There are now utility cloths, men's and women's suits, shoes and lighters.

In England, simplification does not mean complete standardization. The general aim of the government has been to select a reasonably small number of price lines within the ranges affecting the majority of the population. It has then, in consultation with manufacturers, endeavored to embody in a series of specifications the best trade practice at each level while also eliminating all uses of material and labor which do not measurably add to the utility of the product. But it has invariably left some scope for the ingenuity of manufacturers and also some room for some style variations.

This utility program has been introduced at the same time as the concentration program and is often intermingled with it. I have already remarked that when running shoe plants undertake to deliver goods to closed plants they may deliver only utility shoes made according to government specifications. But these shoes bear the brand name of the buyer if he so desires. Furthermore, in granting nucleus certificates to the firms in some industries, the government has specified the amount of labor that may be employed by the closed firms.

In the shoe industry, the maximum necessary labor force for the production of each running plant was calculated and no more was allowed. The Ministry of Food has recently required as a condition of continued operations that firms limit their employment. In the chocolate branch of the candy industry, for instance, a formula has been established determining the number of workers who may be employed per ton of cocoa produced. This formula was so calculated

as to permit only the simplest types of chocolate. Similar arrangements are being made in other concentrated industries.

There is little doubt that similar considerations in this country will stimulate similar action. But labor shortage is at the moment far less than in England, and we have only begun to explore the possibilities of employing women. In England, on the other hand, the extent to which women are actively participating in the war is everywhere strikingly evident. Nevertheless, as you know, labor shortages are appearing and must increase. Furthermore, there are a number of materials which are in sufficiently short supply to make it necessary for us to take action to economize their use. In some form or other, therefore, we must for the period of the war simplify a number of products.

Concentration Releases Workers

The most important result of the concentration program in England has been the release of workers. It is estimated that some 225,000 workers have been released in industries which, previous to curtailment, employed about 700,000 workers. It is also estimated that about 50,000,000 square feet of factory space have been released—a very important consideration in England because of the great needs for buildings for war production and the even greater needs for storage space. These needs, of course, increase with the growth of the American force in England.

Before the British program was announced, it was discussed with a representative group of business leaders who were fearful of the program. Nevertheless, they realized the serious position in which the country found itself after the retreat from Dunkerque and after the severe aerial bombardment in the winter of 1940. The principal labor leaders were also consulted as to the program and supported the proposed policy provided that the government made satisfactory arrangements to prevent unemployment. They emphasized the necessity for timing the releases of labor to coincide with the growing demand for labor in the war program.

After the British had had some sixteen months of experience with the program, I discussed it with representatives of both these groups and found a surprising uniformity of attitude. Representatives of business said that concentration had proved a very serious matter for many businesses. But they were quick to point out also that it was not concentration that was the cause of their trouble, it was the severe curtailment of production. They had been convinced by their experience that the curtailments were obviously necessary to insure the mere sur-

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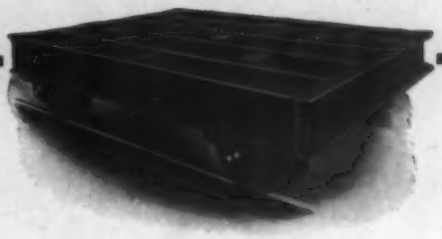

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HERE'S WHY ROPER PUMPS perform better ...last longer!

ONLY 2 MOVING PARTS

GEARS THAT float IN OPERATION

The pumping gears in ROPER "hydraulically balanced" PUMPS have hollow shafts so that internal pressure is equalized at all points. These gears, entirely separate from the drive shaft, are connected only by a sliding joint which permits them to actually "float" in operation. This sliding joint plus a special collar on shaft absorbs any shock or end thrust. This feature means big savings in time and money because "hydraulically balanced" pumps are more efficient, last longer and permit periodic inspection of internal parts without disturbing piping or power unit.

FOUR LARGE REPLACEABLE BEARINGS

The 4 large bearings (two on each side) in ROPER PUMPS are designed and constructed to withstand severe operating abuses and adequately handle peak loads. These flanged high lead bronze bearings also act as wearplates to protect face and backplate from wear. Can be replaced easily and inexpensively.

QUICK FACTS

CAPACITIES—1 to 1000 gallons per minute.

PRESSURES—up to 1000 lbs. per square inch.

SPEEDS—up to 1800 revolutions per minute.

MOUNTINGS and DRIVES for any practical use including hand-operated units.

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A complete summary and digest of factual information concerning pumps and pumping problems.

GEO. D. ROPER CORP., ROCKFORD, ILL.
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ROPER Rotary PUMPS

vival of the country. They were also convinced that as the curtailments were necessary, universal part-time operation was plainly impossible. The attitude of the workers was much the same.

I believe that the War Production Board program for the concentration of production should stimulate conversion to war work because the manufacturers who are engaged primarily in production for the Army and Navy are the least concerned. The producer of shells and projectiles, for example, can certainly be regarded as immune to concentration of production. On the other hand the manufacturer who is engaged in the production of consumer goods and who has been unable or unwilling to get into direct war production is more apt to be involved in concentration of production.

There is no foundation for the belief that any section of the country is to receive benefits to the detriment of another section as a result of the concentration of production. I cannot deny, however, that certain sections will be affected more than others. Some sections are more active industrially than other sections of the country and, consequently, will feel the effect of concentration of production to a larger extent. Many of your industries have been able to contribute directly to the war effort by converting to war production. The plants which have secured direct war contracts, unfortunately are concentrated in certain areas. The demand for more and more production of guns, ships, and planes has been met by keeping the machines running longer hours. This increasing tempo of war production demands more labor and some areas today face critical labor shortages.

On the other hand, some areas have a fair share of consumer goods industries which are not adaptable to direct war work and which have been or will be forced to curtail production because of the shortage of raw materials. Cities and towns which are dependent upon these industries are faced with the prospect of war time depression and unemployment. The natural tendency is for labor to migrate from these areas to the busy, congested cities where war production is booming.

The War Production Board aims to minimize such economic dislocations with the intelligent application of the principle of concentration of production.

No doubt when the meaning of concentration becomes clearer and its objectives better understood, the attitude of business and labor will be much the same here as it is in England. It is the intention of the War Production Board to obtain the advice of both management and labor as to proposed methods of concentrating production.

Training School Guide Offered To Other Plants

To aid companies or other organizations which have training programs, or are contemplating them, B. F. Goodrich Co., Akron, O., is offering its new 26-page manual outlining details of various courses of study conducted by its apprentice school. The publication was issued as a guide for training students in its own school.

Explanation of the school's purpose, method of selecting students, administration of program, co-operative plan with local board of education, ratio of apprentices to journeymen, and length of time required in each of the courses are among topics discussed.

Course of study for each trade is given, both in the classroom and in the shop, and the number of hours required.

Publishes Scrap Book on Magnesium Production

In order to present some essential facts for those who are not familiar with recent methods in the production of magnesium, Fisher Furnace Co., 5535 North Wolcott avenue, Chicago, recently compiled a magnesium scrap book which contains information contributed by many publications and industrial concerns.

Furnaces, fuels, melting and fluxing are some of the subjects covered in the publication. One section of the booklet discusses fire prevention—important in view of the many plants working with this metal today.

Tool Brazing

(*Concluded from Page* 92)

Secret of the superior quality of finish obtained on the tools is that the grinding wheel in addition to rotating, also oscillates while the tool is held stationary at the correct angle. The oscillation is in the plane of the wheel. This oscillation also contributes to the speed with which tools can be ground.

The second important principle involved is that the tool is held against the wheel under a constant and controlled pressure, insuring maximum grinding speed consistent with quality of finish, wheel life, heat generated, etc. The pressure is applied through compressed air. The construction of the device is such as to bring the tool against the wheel under low pressure to remove jagged edges, the pressure automatically increasing to the pre-set amount and being held at that value until the tool is finish ground. The machines are provided with a simple dial control for setting the time cycle.

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SEGMENT FACE CONTACT WHEELS
This 3-M Method of grinding and finishing is helping many finishing rooms out of a "jam." 3-M Abrasive Belts have the cutting power to turn out work with speed and when used with a Segment Face Contact Wheel, many items that previously could not be finished by this method due to their shape are now being finished on time.
When today's war effort demands so much speed, checking your methods may prove the answer to increased production.
A 3-M Methods Engineer will gladly cooperate with you by surveying your present set-up and suggesting the type of 3-M Abrasive Belt and Segment Face Wheel to increase your production. These men have wide experience and are proving a definite aid to industry. This service does not obligate you.
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If you need castings in a hurry—WRITE US NOW.
MUELLER
BRASS CO.
PORT HURON, MICH.

War Needs Stretch Steel Buying Into Next Year

Long-range coverage insures essential supplies. . . Most third quarter tonnage already contracted. . . Coke situation causes apprehension. . . Floods cut scrap receipts

DEMAND
Orders placed for first quarter.

PRODUCTION
Unchanged at 99 per cent.

PRICES
Wise county coke advanced.

STEELMAKERS are booking an increasing number of orders for delivery during first quarter next year and even into second quarter. These cover requirements for long-range war programs and are accompanied by CMP allotment numbers.

These orders are being accepted by producers with sizes and quantities to be specified later. Orders are placed so far in advance to give advantageous position on mill books, though subject to change as requirements develop. Included in this forward buying are plates, wire and wire products, strip and aircraft materials.

Backing up this remote buying is the fact that mills in general are sold practically through third quarter and into fourth quarter on plates, bars, wire, sheets and strip, with little open capacity for the former. Some tonnage can be accepted for July and August but this is becoming more difficult to place week by week.

Wire and specialties are in strong demand, largely for aircraft work and other war requirements and deliveries are lengthening steadily. To obtain third quarter shipment often requires much shopping. Producers able until recently to give better than average promise now are filling up so that they can not offer any advantage. Some PRP tonnage will not be shipped before the June 30 deadline and disposition of such orders has not been decided.

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Sheet capacity for third quarter is filling rapidly, especially in hot-rolled, some mills being completely filled and others able to accept small lots. Need for strip for the aircraft industry is increasing. Some producers are sold up to their directive quotas into October. Many changes in specifications are being made in alloy strip to improve deliveries to meet schedules of users. New England shoe manufacturers require much strip steel for shoe shanks, the quartermaster at Boston currently placing orders for 460,000 pairs.

Radical changes have been wrought by war conditions on the structural shape market. Restrictions on building have eliminated nearly all demand for beams and heavy sections and fabricators now are engaged on miscellaneous work, largely for shipbuilding. For this only lighter sections are required. Fabricators now use a larger proportion of plates, heavy sheets and bars, with greatly reduced need for shapes. On these lighter materials many mills are sold up to their quotas for third quarter and in some cases beyond. Shape mills in general are at 60 to 65 per cent of capacity, with some slightly higher on account of shipyard affiliations.

Steel production last week remained at 99 per cent, the same as the prior week this year and the corresponding dates in 1941 and 1942. Chicago gained ½-point to 97 per cent and Buffalo 2½ points to 93 per cent. Cincinnati dropped 10 points to 84 per cent because of furnace repairs. St. Louis was off 3 points to 87, New England 5 points to 90 and Detroit lost 2 points to 94 per cent. Other districts held steady, Pittsburgh, 99; eastern Pennsylvania, 95; Wheeling, 93; Cleveland, 96; Youngstown, 97; Birmingham, 100.

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Machine tool buying continues to slacken and deliveries exceed new purchases, but few orders are held back or cancelled. Equipment for a new air-cooled aircraft engine plant in the East has been placed ahead of every other order and has resulted in some needed quipment being pushed back. Such cancellations as are being received are caused mainly by changes in the war program rather than diminution of production. Machine tool builders are increasingly taking on subcontract work in allied lines as their order backlogs diminish.

Scrap is in good supply and quality is better, industrial, railroad and agricultural grades predominating over the lighter material that made up most of offerings a few months ago. Flood conditions have delayed delivery in some areas, notably St. Louis and Buffalo. Reserves are sufficient to carry melters until normal conditions return.

Concern is felt over the coke situation as sporadic strikes delay coal deliveries and threaten output. Blast furnace stocks of coke have declined and in some instances operation is hand-to-mouth. With new furnaces coming into production later this year coke supply is a material consideration. OPA has raised ceilings on Wise county grades by 25 cents per net ton. It was found the former ceilings caused a loss to producers. The action followed a similar concession to hand-drawn operators in the Connellsville region some time ago.

Composite prices of steel and iron products are unchanged from recent weeks. Finished steel composite remains at $56.73, semifinished steel at $36, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	May 29	May 22	May 15	One Month Ago Apr., 1943	Three Months Ago Feb., 1943	One Year Ago May, 1942	Five Years Ago May, 1938
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.00
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	23.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	11.60

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	May 29 1943	April, 1943	Feb., 1943	May, 1942
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.49	2.49	2.49
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.15	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	May 29 1943	April, 1943	Feb., 1943	May, 1942
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.19
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.34	25.39	25.39	25.39
No. 2 fdry., del. Pitts., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.06
No. 2X, del. Phila. (differ. av.)	26.215	26.265	26.265	26.265
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.54	31.54	31.54	31.54
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.33	140.65	140.65	140.65

Scrap

Heavy melting steel, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke

Connellsville, furnace, ovens	$6.50	$6.50	$6.40	$6.00
Connellsville, foundry, ovens	7.75	7.75	7.50	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bil.) $36.00.
(Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co. $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.
Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10; Galveston, $0.27. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.49c; Phila. del. 2.47c; Gulf Ports, dock 2.52c, all-rail 2.59c; Pac. ports, dock 2.80c. (Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points. Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced in its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.82c.

(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.55
		(.20-.30 Mo)	0.60
2300	1.70	4340	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.70	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.27c; New York del., 2.34c; Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.67c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)
Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.
Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.
Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.
Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box $4.50.
Tin Mill Black Plate, Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.
Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.
Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.
Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.29c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c.
(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill, Central Iron & Steel Co. 2.20c, f.o.b. basing points.)
Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.
Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.27c; Phila., del., 2.215c; Gulf ports, 2.47c; Pacific ports, 2.75c.
(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)
Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c
Wire Products to the Trade:	
Standard and Cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	.67
Do., 11 gage and heavier	.70
Barbed wire, 80-rod spool, col.	.70
Twisted barbless wire, col.	.70
Single loop bale ties, col.	.59
Fence posts, carloads, col.	.69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	¼	24	3½
¼ & ⅜	59	40½	⅜	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1⅝"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., .fo.b. mill, gross ton, $40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.
*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.
High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	-	67.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.
Extras mean additions or deductions from base prices in effect April 16, 1941.
Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.
Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.
Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.
Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

⅛ x 6 and smaller	65½ off
Do., ¼ and ⅜ x 6-in. and shorter	63½ off
Do., ½ to 1 x 6-in. and shorter	61 off
1¼ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	38 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex.	U.S.S.	S.A.E.
⅞-inch and less	62	64
½-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens	
Connellsville, furnace	*6.50
Connellsville, foundry	7.50- 8.00
Connellsville prem. fdry.	7.75- 8.10
New River, foundry	8.50- 8.75
Wise county, foundry	7.25- 7.75
Wise county, furnace	6.75- 7.25
By-Product Foundry	
Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge $7.00, effective Feb. 3, 1943.
†$12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

Pig Iron

PIG IRON

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.53	26.03	27.53	27.03
Brooklyn, N. Y., del.	27.50	.....	.....	28.00
Birdsboro, Pa., base	25.00	24.50	26.00	25.50
Birmingham, base	‡20.38	†19.00	.....	.....
Baltimore, del.	25.61	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	24.22	.....	.....	.....
Cincinnati, del.	24.06	22.60	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.15	.....	.....	.....
Philadelphia, del.	25.46	24.58	.....	.....
St. Louis, del.	24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.10	24.60	25.60	25.10
Muskegon, Mich., del.	27.19	.....	.....	27.19
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.39	24.89	25.89	25.39
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.31	25.81	26.81	26.31
Duluth, base	24.50	24.00	25.00	24.50
St. Paul, del.	26.63	26.13	27.13	26.63
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston, del.	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.44	24.61	.....	25.11
Neville Island, Pa., base	24.00	23.50	24.50	24.00
§Pittsburgh, del. No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	21.50	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	25.99	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.84	25.34	.....	26.34
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	25.94	25.44	25.44	25.94
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn. $28.00
Chicago, del. 31.34
(For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

Gray Forge

Neville Island, Pa. $23.50
Valley, base 23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.74, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky. $64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00

Second Quality

Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00

Malleable Bung Brick

All bases $59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

FLUORSPAR

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $25.00-28.00
Do., barge 25.00-28.00
No. 2 lump 25.00-28.00
(Prices effective Nov. 23, 1942)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.33; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36

Electrolytic manganese: 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

Chromium Metal: Per lb contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers plants, freight ton lots 15.00c, less-ton lots 15.25c, allowed; 1% iron; carlots 14.50c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton $135; ton lots $147.50. Spot $5 per ton higher.

Silico-manganese Briquets: contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; less 200-lb. lots 6.80c. Spot prices ton lots 6.30c; less-ton lots 6.55c; ¼-cent higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity, $1.10 per pound V_2O_5 contained; spot 5 cents up.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ½-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.00c; ton lots 10.50c, less ton lots, 11.00c.

Borosil: 3 to 4% boron, 40 to 45% Si., $7 lb. cont Bo., f.o.b. Philo, O.

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	AISI hot bars 2300 series	AISI hot bars 3100 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.144[13]	4.715	7.762[23]	6.062[23]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.103[31]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.103[31]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[15]	4.872[25]	4.072[21]	4.772	7.566[23]	5.866[23]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[25]	4.052[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[26]	4.041[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[21]	4.165[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.62[1]	5.25[1]	3.25[1]	3.82[1]	3.82[1]	4.75[13]	4.30[13]	3.75[21]	3.52	7.35[23]	5.65[23]
Buffalo (country)	3.25[1]	3.30[1]	3.62[1]	5.25[1]	3.15[1]	3.82[1]	3.82[1]	4.65[13]	4.20[13]	3.65[21]	.....	.....	.....
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[13]	4.00[24]	3.65[21]	.....	7.45[23]	5.75[23]
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[13]	4.00[13]	3.65[21]	.....	.....	.....
Cleveland (city)	3.25[1]	3.58[1]	3.40[1]	5.18[1]	3.35[1]	3.50[1]	3.50[1]	4.62[13]	4.05[24]	3.75[21]	3.20	7.55[23]	5.85[23]
Cleveland (country)	3.25[1]	3.58[1]	3.30[1]	5.18[1]	3.25[1]	3.50[1]	3.50[1]	4.62[13]	3.95[24]	3.65[21]	.....	.....	.....
Detroit	3.43[1]	3.65[1]	3.60[1]	5.27[1]	3.43[1]	3.43[1]	3.68[1]	4.84[13]	4.30[24]	3.80[21]	3.40	7.67[23]	5.97[23]
Omaha (city)	4.10[1]	4.15[1]	4.15[1]	5.75[1]	3.85[1]	4.20[1]	4.20[1]	5.52[13]	4.77[24]	4.42[21]	.....	.....	.....
Omaha (country)	4.00[1]	4.05[1]	4.05[1]	5.65[1]	3.75[1]	4.10[1]	4.10[1]	5.52[13]	4.77[24]	4.42[21]	.....	.....	.....
Cincinnati	3.60[1]	3.68[1]	3.65[1]	5.28[1]	3.42[1]	3.67[1]	3.67[1]	4.92[13]	4.37[24]	4.00[21]	3.45	7.69[23]	5.99[23]
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[13]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.40[13]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	4.85[13]	4.10[24]	3.75[21]	3.50	7.35[23]	5.65[23]
Chicago (country)	3.40[1]	3.45[1]	3.45[1]	5.05[1]	3.15[1]	3.50[1]	3.50[1]	4.75[13]	4.00[24]	3.65[21]	.....	.....	.....
Milwaukee	3.63[1]	3.68[1]	3.68[1]	5.28[1]	3.38[1]	3.73[1]	3.73[1]	4.98[13]	4.23[24]	3.88[21]	3.54	7.33[23]	5.88[23]
St. Paul	3.75[1]	3.80[1]	3.80[1]	5.40[1]	3.50[1]	3.85[1]	3.85[1]	5.00[1]	4.35[1]	4.34[21]	3.83	7.70[23]	6.00[23]
St. Louis	3.64[1]	3.69[1]	3.69[1]	5.29[1]	3.39[1]	3.74[1]	3.74[1]	4.99[13]	4.24[24]	4.02[21]	3.61	7.72[23]	6.02[23]
Indianapolis (city)	3.60[1]	3.70[1]	3.70[1]	5.30[1]	3.45[1]	3.75[1]	3.75[1]	5.01[13]	4.25[24]	3.97[21]	.....	.....	.....
Indianapolis (country)	3.35[1]	3.45[1]	3.40[1]	5.05[1]	3.20[1]	3.50[1]	3.50[1]	5.01[13]	4.00[24]	3.97[21]	.....	.....	.....
Memphis, Tenn.	3.90[1]	3.95[1]	3.95[1]	5.71[1]	3.85[1]	4.10[1]	4.10[1]	5.25[13]	4.66[24]	4.31[21]	.....	.....	.....
Birmingham (city)	3.50[1]	3.55[1]	3.55[1]	5.83[1]	3.45[1]	3.70[1]	3.70[1]	4.75[13]	4.78[24]	4.43[21]	.....	.....	.....
Birmingham (country)	3.40[1]	3.45[1]	3.45[1]	5.83[1]	3.35[1]	3.60[1]	3.60[1]	4.75[13]	4.78[24]	4.43[21]	.....	.....	.....
New Orleans (city)	4.10[1]	3.90[1]	3.90[1]	5.85[1]	3.95[1]	4.20[1]	4.20[1]	5.25[13]	4.95[13]	4.60[21]	5.00	.....	.....
New Orleans (country)	4.00[1]	3.80[1]	3.80[1]	5.75[1]	3.85[1]	4.10[1]	4.10[1]	5.15[13]	4.95[13]	4.60[21]	.....	.....	.....
Houston, Tex.	3.75[1]	4.25[1]	4.25[1]	5.50[1]	3.75[1]	4.30[1]	4.30[1]	5.25[13]	5.43[13]	4.50[13]	.....	.....	.....
Los Angeles	4.35[1]	4.60[1]	4.90[1]	7.15[1]	4.95[1]	4.90[1]	6.70[1]	5.95[13]	7.15[1]	5.70[13]	.....	9.55[23]	8.35[23]
San Francisco (city)	3.95[1]	4.35[1]	4.65[1]	6.35[1]	4.55[1]	4.50[1]	4.50[1]	6.60[13]	7.55[13]	5.55[13]	.....	9.80[23]	8.80[23]
San Francisco (country)	3.85[1]	4.25[1]	4.55[1]	6.25[1]	4.45[1]	4.40[1]	4.40[1]	6.50[13]	7.45[13]	5.45[13]	.....	.....	.....
Tacoma	4.20[1]	4.45[1]	4.75[1]	6.50[1]	4.65[1]	4.25[1]	5.45[1]	5.70[1]	6.68[24]	5.75[13]	.....	.....	.....
Seattle (city)	4.20[1]	4.45[1]	4.75[1]	6.50[1]	4.65[1]	4.35[1]	5.45[1]	5.70[1]	6.68[24]	5.75[13]	.....	.....	8.00[23]

*Basing point cities, with quotations representing mill prices, plus warehouse spread.

NOTE—All prices except cold-rolled strip and AISI hot-rolled bars fixed by Office of Price Administration in amendments Nos. 10 and 14 to Revised Price Schedule No. 49.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 3999 pounds; [6]—300 to 1999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds: [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 500 pounds and over, base.

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (seller's nearest rail)	
48% 3:1	52.80

less $7 freight allowance

Manganese Ore

Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)

Brazilian, 48%	73.8c
Brazilian, 46%	71.8c
Caucasian, 51%	75.3c
Caucasian, 50%	74.8c
Chilean, 48%	73.8c
Indian, 50%	74.8c
Indian, 48%	73.8c
South African, 48%	73.8c
South African, 46%	71.8c
(Duty Free)	
Cuban, 51%	86.5c
Cuban, 48%	85.0c
Cuban, 45%	82.0c
Philippine, 50%	85.0c
Domestic, 48%, f.o.b. mines	100.0c

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Bars per 100 lb.	Basic open-hearth Billets per G T	Electric furnace Bars per 100 lb.	Electric furnace Billets per G T
NE 1330	.28-.33	1.60-1.90	.20-.35	.....	.....	.....	$ .10	$2.00	.....	.....
NE 8020	.18-.23	1.00-1.30	.20-.35	.....	.....	.10-.20	.45	9.00	$.95	$19.00
NE 8442	.40-.45	1.30-1.60	.20-.35	.....	.....	.30-.40	.90	18.00	1.40	28.00
NE 8613	.12-.17	.70- .90	.20-.35	.40-.60	.40-.70	.15-.25	.75	15.00	1.25	25.00
NE 8720	.18-.18	.70- .90	.20-.35	.40-.60	.40-.70	.20-.30	.80	16.00	1.30	26.00
NE 9255	.50-.60	.75-1.00	1.80-2.20	.....	.....	.....	.40	8.00	.....	.....
NE 9262	.55-.65	.75-1.00	1.80-2.20	.20-.40	.....	.....	.65	13.00	.....	.....
NE 9415	.13-.18	.80-1.10	.40-.60	.20-.40	.20-.50	.08-.15	.80	16.00	1.30	26.00
NE 9442	.40-.45	1.00-1.30	.40-.60	.20-.40	.20-.50	.08-.15	.85	17.00	1.35	27.00
NE 9537	.35-.40	1.20-1.50	.40-.60	.40-.60	.40-.70	.15-.25	1.20	24.00	1.70	34.00
NE 9630	.28-.33	1.20-1.50	.40-.60	.40-.60	.....	.....	.80	16.00	1.30	26.00
NE 9642	.40-.45	1.30-1.60	.40-.60	.40-.60	.....	.....	.85	17.00	1.35	27.00

Chemical Composition Limits, Per Cent

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

					ELECTRIC FURNACE, ACID OPEN-HEARTH AND FOUNDRY GRADES									
					Low Phos. Grades									
	OPEN HEARTH GRADES*	Mixed Bor., Turn., Machine Turnings	Cast Iron Borings	Shoveling Turnings	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate 3 ft. and less	2 ft. and less	1 ft. and less	Foundry Steel 2 ft. and less	1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$15.00	$16.00	$17.00	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Bethlehem	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Buffalo	19.25	14.25	15.25	16.25	24.25	21.75	20.75	21.25	21.75	20.75	21.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	14.50	15.50	16.50	24.50	22.00	21.00	21.50	22.00	21.00	21.50	17.50	19.00	20.50
Detroit	17.85	12.85	13.85	14.85	22.85	20.35	19.35	19.85	20.35	19.35	19.85	15.85	17.35	18.85
Toledo	†15.35	12.85	13.85	14.85										
Chicago	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Kokomo	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Duluth	18.00	13.00	14.00	15.00	23.00	20.50	19.50	20.00	20.50	19.50	20.00	16.00	17.50	19.00
St. Louis	17.50	12.50	13.50	14.50	22.50	20.00	19.00	19.50	20.00	19.00	19.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	12.00	13.00	14.00	22.00	19.50	18.50	19.00	19.50	18.50	19.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	12.50	13.50	21.50	19.00	18.00	18.50	19.00	18.00	18.50	14.50	16.00	17.50
Seattle	14.50	9.50	10.50	11.50	19.50	17.00	16.00	16.50	17.00	16.00	16.50	12.50	14.00	15.50

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	$21.00	$22.00	$23.50	$24.00	$24.25	$24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	15.50	16.50	17.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

*Open Hearth Grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. †Toledo open-hearth grades cover only No. 2 busheling.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $3.50 less; (material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap."

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 12.25c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 14.25c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, corroding or chemical, 6.40c, E. St. Louis for carlots; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York State, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less than 2000 lbs.

Secondary Aluminum: All grades 15.00c per lb. except as follows: Low-grade piston alloy (No. 122 type) 14.50c; No. 12 foundry alloy (No. 2 grade) 14.50c; chemical warfare service ingot (99½% plus) 14.50c; steel deoxidizers in notchbars, granulated or shot, including ingot containing over 2% iron, Grade 1 (96-97½%) 14.75c, Grade 2 (92-95%) 14.50c, Grade 3 (90-92%) 14.00c, Grade 4 (85-90%) 13.50c, Grade 5 (less than 85%) 12.50c. Above prices for 30,000 lbs. or more; add ¼c 10,000-30,000 lbs.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb.; add 1c for special shapes and sizes, including 3-lb. ingot and 12-lb. round ingot; incendiary bomb alloy 23.40c, 50-50 magnesium-aluminum 23.75c, ASTM B80-41T No. 11 25.00c, ASTM B94-40T No. 13 25.00c, all others 23.00c. Prices for 100 lbs. or more; for 25-100 lbs. add 10c; for less than 25 lbs. 20c; incendiary bomb alloy f.o.b. plant any quantity; carload freight rate allowed all others for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.75-99.79% incl. 51.62½c; Grade C, Cornish refined 51.62½c; Grade D, 99.0-99.74% incl. 51.12½c, Grade E, below 99%, 51.00c.

Antimony: American, bulk, carlots, f.o.b. Laredo, Tex., 99.0-99.8% grade 14.50c, 99.8% and over (arsenic 0.05% max.; no other impurity to exceed 0.1% 15.00c. Add ¼c for less-carlots to 10,000 lbs.; ½c for 9999-224 lbs.; 2c for 223 lbs. and less.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz. $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $15 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $2.11 lb.; 100 lbs. or more on contract, $1.50 lb.

Indium: 99.5%, $10 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y., 44.75c per ounce.

Platinum: $36 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A, B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 28.75c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c, Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.96c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Bare, soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlots 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat, mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameters 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.50c Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu; 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled, carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400-lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c, f.o.b. Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¾c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil., 5%	9.250	9.000	4.625
Phos. br., A. B. 5%	11.00	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	3.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbitt-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 8.00c; Muntz metal condenser tubes 7.50c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more; plant scrap only. Segregated 2s solids 10.00c, 11.00c, 11.50c; all other solids 9.50c, 10.50c, 11.00c; borings and turnings 7.50c, 8.50c, 9.00c; mixed solids 8.50c, 9.50c, 10.00c, mixed borings and turnings 6.50c, 7.50c, 8.00c.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings, old zinc 7.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c; add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clippings 20.00c; soldered sheet 18.00c.

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Sheets, Strip . . .

Sheet & Strip Prices, Page 110

Third quarter backlogs are building up rapidly at various sheet mills, some now virtually booked up for the entire period on hot-rolled sheets, while others are sold out through July and August. More capacity is available for cold-rolled than for hot-rolled and in some instances the latter can be had for delivery in July. Careful shopping occasionally can develop hot-rolled sheets for July shipment, but only a limited quantity. Little galvanized tonnage can be had before August.

Mills producing narrow cold-rolled strip specialties are generally sold up to directive quotas for third quarter, with 80 per cent of October capacity taken. Alloy orders for late fourth quarter delivery are being placed in heavier volume, as well as some carbon stock. The gap between melting schedules and finished alloy deliveries ranges beyond 105 days. To co-ordinate melting schedules with wanted delivery on cold-rolled strip requires specification changes in many cases. Low-alloy NE and high-carbon steel are replacing higher alloys in more fabricating and various carbon grades are also substituted for some aircraft uses.

Demand for strip for the aircraft industry is increasing and heavy consumption for communication belt links continues. Electric-furnace steel for rerolling is tighter than open-hearth and some specifications for the latter as a substitute are accepted.

The shoe industry in New England requires more strip steel for shanks for shoes for the services. The quartermaster department, Boston, is placing contracts for 460,000 pairs of steel and leatherboard shanks.

Buyers unable to place tonnage in the East in some instances have had better success in the Mid-west, with promise of quicker delivery. Adjustment of rerolling schedules to CMP deliveries is the major problem. Mills normally are adjusted to maximum tonnage output over a given run but under CMP schedules are tied down to quotas and deliveries, with less flexibility.

Bars . . .

Bar Prices, Page 110

Readjustments in the war program have resulted in an easier situation on steel bars with some mills and cancellations having been received. Some producers can make deliveries now that were not possible a fortnight ago. This is regarded as a temporary phase and in general bars still are tighter than most other major products. The easing is reflected in alloy as well as carbon bars, a factor in alloys being the increased capacity expected to go into production early in third quarter.

Almost no capacity is available for July delivery and not much for August. Some mills are booked up almost completely for third quarter and have substantial backlogs beyond. Large rounds and flats continue difficult to obtain.

Commercial heat treating plants are heavily booked on fabricated parts and are limited in ability to take on bar stock for processing. Users of normalized and heat-treated carbon and alloy bars in small lots, usually dependent on warehouses, are concerned as to future supply as deliveries of these

grades to distributors are curtailed. While this has not reached serious proportions it may become so with small buyers.

Steady transition to NE steels continues. Results generally are satisfactory through trial and error, but not without some revisions in practice in some cases. Further metallurgical probing is necessary in the case of heavy forged link chain in at least one plant in the East.

Plates . . .

Plate Prices, Page 111

Appreciable increase in plate buying featured the closing days of May as consumers hastened to get in orders for July rolling. As recently as early last week, several plate mills had substantial capacity available but it appears now that bookings have been sufficient to fill July schedules. At the same time future buying has increased for long-range projects, orders running past the end of the year.

Plate deliveries appear to be meeting all requirements and producers are not being pressed by consumers to hasten shipments or give information as to when material will be received. Consumer stocks appear to be sufficient to meet needs.

Plate orders for shipbuilding, synthetic rubber and high-octane gasoline plants, bearing CMP allotment numbers, are being received by mills for delivery as far ahead as first quarter. Tonnage releases for destroyer escort vessels are more active and there is increasing demand for floor plate.

Fabricators of storage tanks are relying increasingly on ship work, wind tunnels and other miscellaneous assemblies. Many have practically exhausted backlogs of tankwork, including contracts for rubber and gasoline plants. Renewed buying for these purposes is expected later in the summer.

Deliveries of plate ends, accumulations of off-size material, to distributors, is unsatisfactory and some are refusing further shipments, others reducing their stocks. At the same time they are in need of standard and wider plates.

Wire . . .

Wire Prices, Page 111

With wire mill schedules on some specialties filled for third quarter and beyond, consumers are forced to shop more widely for some products required for that period. Producers currently able to better the average on some materials are rapidly filling up. A mill recently able to ship music wire in six to eight weeks is gradually lengthening deliveries as users unable to place tonnage with usual sources are filling the gap. Demand for music wire is heavy, with a tendency to specify that grade for more war requirements.

Until recently ability to deliver numerous products has varied among mills but those making earlier shipments are becoming more extended. High-carbon rounds lead demand, with annealing capacity regulating ability of some sellers to accept orders for shipment at specified dates. Low-carbon grades and flat wire are dragging. Substantial part of the latter products, entering into civilian formed goods, has been restricted for some time, while demand for high-carbon material, needed for mechanical use, including springs, continues to

Acme-Gridley Automatics are fighting on every production front—turning out vast quantities of vital metal parts—with characteristic accuracy, speed and economy. Handling these indispensable production units in connection with machining, assembling and shipping operations are nine Euclid Cranes.

These cranes were selected largely because of long demonstrated reliability, convenient floor control and high headroom clearance that permits high piling of heavy parts. They operate almost continuously 24 hours a day, 6 days a week.

The basic aim in designing Euclid Cranes, and Hoists, too, has always been to embody features that assure long, trouble-free service with minimum attention and upkeep cost. That they measure up to this standard is indicated by the discriminating type of purchasers—many of whom have reordered Euclid equipment each time a new demand has developed.

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mount. Shaped wire is irregular and inclined to lag, although a large inquiry for hexagon has been placed recently.

Not all tonnage taken under PRP for shipment before June 30 will be cleared and the disposition of these orders is uncertain. Matching production schedules with delivery specifications continues the major mill problem, further hampered by growing manpower shortages.

New Extras Issued on Cold-Finished Alloy Bars

American Steel & Wire Co. has issued a new list of extras and deductions on cold-finished alloy steel bars. The list, which is dated April 15, 1943, supersedes the list of Oct. 1, 1940.

Principal change is a revised table showing extras for alloy content on the basis of American Iron and Steel Institute numbers instead of SAE and special classifications.

New size extras on small diameter rounds, which have been in effect for some time, are published for the first time. The extras cover rounds from 0.035-inch diameter up to but not including ⅛-inch diameter. Charges per hundred pounds are as follows: 0.035-inch to less than 3/64-inch $6.50; 3/64-inch to less than 1/16-inch $5.50; 1/16-inch to less than 3/32-inch $4.75; 3/32-inch to less than ⅛-inch $4.50. Other size extras remain unchanged.

Structural Shapes . . .

Structural Shape Prices, Page 111

On some sizes, notably those required in shipbuilding, structural mills are sold well into third quarter and even beyond for long-range programs. Lack of heavier sections and beams restricts total tonnage of mills, which are engaged at 60 to 65 per cent of capacity for the industry as a whole. Integrated mills with shipyards are doing slightly better. Semifinished steel allocated to structural mills is well geared to current fabricating requirements and much ingot tonnage that normally would go into shapes is being diverted elsewhere. Deliveries are easier and pressure is less than on most steel products and for an indefinite period mills have reasonably clear outlook as to demand and their part in meeting it.

Developments have revolutionized much of the work done by fabricators, which is reflected in material requirements. Welding shops are busy, with riveting and heavy shop equipment only partially engaged. More engineering and labor are required for many shop contracts, using fewer shapes but more plates, bars and heavy sheets. More pieces per ton are going into miscellaneous assemblies and fabricators frequently are profiting more per ton than in normal operations on building material.

The type of miscellaneous fabrication is broadening, sometimes at the expense of shapes and when the latter are required lighter material is specified. As an instance of the wide range of work, one shop is making turnbuckles, usually forged, by welding a right and left turn nut to ends of two flat bars, eliminating forging and allowing a large range of sizes and materially reducing production time.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 111

Mills are attempting to get higher directives for June on the basis of increased orders which cannot be filled under current directives. Demand from jobbers is exceptionally high because most of their orders are rated under the Production Requirements Plan which expires June 30. All such orders will be cancelled at the end of June, and for that reason jobbers are particularly anxious to get delivery during that month. There has been a sharp decline in jobber stocks since the first of this year, running about 40 per cent, and most jobbers are making efforts to rebuild stocks before the current ratings expire.

Production quotas for reinforcing bar mills in June will be approximately 40 per cent above those of May and indications are that for the coming months the allocations committee of WPB will maintain directed output abreast of demand, which is light. This increase can be attained easily by use of rejected offheat billets, part of which normally went to this outlet. The cutback in rollings in recent months has been so sharp that much of this semifinished has been remelted as scrap.

Warehouse . . .

Warehouse Prices, Page 113

Trend in warehouse shipments has been steadily upward each successive month this year, reflecting general improvement in inventory position. There is little doubt distributors will receive entire second quarter allotments.

Though demand is heavy, stock replacements and inventories built up by directives are better balanced on most products, including larger bars and flats. Deliveries of many products are made as soon as received from mills. Demand for alloy material earmarked for aircraft tends to increase. Most stocks of seamless tubing, including cold-drawn, are small as mills are committed heavily on direct contracts for aircraft. Welded tubing is being substituted increasingly.

New OPA warehouse steel prices for the fifth zone, which includes Ohio, West Virginia, Kentucky and part of New York, Pennsylvania, Michigan and Indiana, have been approved and are expected to become effective early in June.

Principal changes in prices for the Cleveland area include an upward revision from $1.50 to $2 in quantity extra on cold-rolled bars under 100 pounds, and an increase in quantity extras on galvanized sheets. Cleveland area will also be allowed an extra of 10 cents per 100 pounds on items for which the city is a mill basing point, for delivery within the switching district. This did not formerly apply on bars. Under the new schedule prices in the Cleveland district will go generally somewhat higher, for they are currently below the average of other market districts within the fifth zone.

Pig Iron . . .

Pig Iron Prices, Page 112

Lighter allocation of pig iron for shipment in June is reported from some areas, attributed to falling off in melt in some directions as the production picture changes. There is continued backing up in specifications from machine tool builders and decline in other less important consuming elements. Some stove manufacturers are doing better than they had expected.

More southern iron is scheduled to move into eastern Pennsylvania in June than for some time, particularly basic. This is said to be due to sustained demand in the North and an easing in the South. Close to 3000 tons of basic produced in May by the Riddlesburg, Pa., blast furnace, which blew out May 20, is said to have been allocated to several consumers at the recently established OPA ceiling of $29.19, furnace. This represented a higher price than these consumers normally pay.

Hanna Furnace Corp. has relighted its fourth stack at Buffalo after being down for relining since April 1.

Decline in pig iron melt in New England is confined to gray iron shops; allocations to steel and malleable foundries and steelworks for June are maintained. Foundries affected by lighter demand for machine tools, notably jobbing shops, require less iron and in some instances tool builders operating their own cupolas are in the same category. A few melters are not in need of allocations, current operations and inventories considered, while more ask for reduced tonnage. Total melt has not declined materially but loss in gray iron foundry melt is not fully made up in other directions. With this has developed a tendency on the part of some consumers to insist on more strict adherence to analysis and specifications. Without exception steelworks are operating with lower reserves of basic than in peacetime and have been since reserves were worked off during the first months of allocations.

Scrap . . .

Scrap Prices, Page 114

About 8000 tons of scrap enroute to Buffalo consumers have been tied up on the Mohawk river as floods stopped canal navigation. First cargoes from the head of the lakes were due over the week end and were relied on to ease the situation in that area.

New England scrap consumers, including electric furnace operators, are currently well supplied with heavier grades, but receipts of lighter material by yards is much less than recently. Industrial and shipyard scrap is coming out in good volume. A substantial part of No. 1 heavy melting steel is being allocated. Foundries in that area have the largest inventory in many months, notably the larger units, in gray iron and malleable. This has slackened buying of foundry grades, with the exception of No. 1 machinery cast, which is scarce.

St. Louis melters are operating mainly in reserves as floods have virtually stopped deliveries. Stocks are considered sufficient to bridge the gap.

In eastern Pennsylvania all leading grades except heavy breakable cast are in easy supply. Some plate scrap was held up recently by electric furnace operators who a short time ago could not obtain enough. Most foundry grades and turnings are well in excess of demand.

Open-hearth scrap produced in the New York area is moving to consumers promptly, much by allocation. Much No. 2 heavy melting steel is going to Buffalo from Hudson river points. Close atten-

tion is given to inventories in making allocations. A large part of No. 1 melting steel goes back directly to steel mills and most open-hearth grades handled by dealers is No. 2. Railroad offerings are light and nearly all is allocated.

A steelmaker in the Detroit district reports increasing difficulty in making alloy heats such as NE steels, because of WPB insistence on using all alloy content in scrap. With large quantities of armor plate scrap to be utilized, carrying high silicon, it is difficult to produce metal which does not contain too much silicon.

Rain and flood conditions in the Midwest interfered with collection, transportation and processing of scrap for the Chicago area, receipts being materially less than in recent weeks. Yard labor is a handicap from shortage and inexperience. Borings and turnings are being accepted more readily in that district while other grades are in smaller supply.

In northern Ohio 473 automobile wreckers shipped 7091 tons of steel scrap during April, compared with 10,311 tons in March. Trend of this source is downward and is currently less than half that of August, 1942. This group of wreckers had 11,640 cars on hand April 30, against 13,113 at the end of March. They bought 4070 cars in April, compared with 4209 in March and an average of more than 6000 during the final months last year.

Automobile wreckers are apprehensive that WPB order M-311, forbidding sale as scrap of serviceable automobile parts will cause them to accumulate large inventory of stocks for which there is no sale. It is asserted this regulation will reduce greatly scrap tonnage available from wrecking yards.

Tin Plate . . .

Tin Plate Prices, Page 111

Tin plate production is at about 60 per cent of capacity and the volume of domestic tin plate business is encouraging. In fact, orders booked are larger than had been expected, and while total production is running behind schedules, this is due mainly to failure of large export business to materialize. Lend-lease requirements have been substantially below estimates, and while there are still promises that such business will increase sharply during last half, they are no better than they were during the first quarter. Work is progressing rapidly on electrolytic units and some partially completed lines are already turning out plate. Practically all current orders have been placed under CMP and new bookings indicate that more advance orders are now being booked than at any time since the priority system began to function. This is a result of advance validation of orders, particularly by large customers.

Metallurgical Coke . . .

Coke Prices, Page 111

Coke supply for blast furnace use is a matter of concern. Sporadic strikes of few days' duration at various mines have cut into deliveries to beehive ovens and a general tightening of the coke situation has resulted. Up to the present supplies of coke have been adequate to maintain blast furnace operations, but stocks have declined and

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some furnaces are virtually on a hand-to-mouth basis. Since the heating season has ended, a relatively larger supply of coke is available, and this has bridged the gap.

It may even be possible with full production during the summer months for blast furnaces to build up a reserve stock, although this cannot be construed as meaning an easier situation in coke markets at any time this year, because new blast furnaces will be in operation before the end of the year and will require a greater supply. The initial impact of these new furnaces on the market will probably be eased to some extent by other furnaces now in operation going off for relining and repair.

Wise County Coke Given Increase of 25 Cents

Office of Price Administration has allowed an increase of 25 cents per net ton for beehive coke produced in Wise county, Virginia, providing ceilings believed necessary to keep producers in business and assure needed supply. Resulting ceilings will vary from $6.75 to $7.25 per net ton for blast furnace coke, $7.25 to $7.75 for foundry and $5.25 to $5.75 for nut coke. Ceiling prices for the county's five main producers had been frozen by regulation at levels prevailing between Dec. 15 and 31, 1941.

After conference with the industry OPA decided wage and cost increases had compelled the companies to produce at a loss. Long-term contracts will continue to their expiration and a considerable percentage of coke will be delivered at less than maximum prices.

All Wise county ovens are hand-drawn, although not all their coal supply is trucked. In authorizing the increase OPA took into consideration similar increases recently made for producers in Pennsylvania and in three West Virginia counties. These actions permitted a ceiling of $7, f.o.b. Connellsville, Pa., plus freight to destination.

Steel in Europe . . .

London—(*By Radio*)—Buying of steel in Great Britain is slower as second quarter booking is almost complete, but plate consumers are covering requirements to the end of September. Consumption of pig iron is increasing. Demand for wrought iron products shows increased activity.

Pacific Coast . . .

Seattle—Local rolling mills are producing a larger tonnage of reinforcing under CMP although most production consists of merchant bars which the ship construction industry is using in heavy volume. Occasional lots of reinforcing for approved projects are being placed but demand for this item is slow.

The scrap situation remains entirely satisfactory with a steady volume of good material coming from shipyards, almost equal to demand of mills. Considerable miscellaneous scrap remains at collection points, following the drive of last winter. This is being gradually processed and will be absorbed soon.

The week's awards include 3000 tons of reinforcing bars placed with Northwest Steel Rolling Mills, Seattle, for Tacoma's second Nisqually power project. This contract was originally awarded to another interest but was transferred. Pacific Car & Foundry Co., Seattle, has taken nearly 1000 tons of shapes including 750 tons for an undisclosed military project and 200 tons or more involved in miscellaneous small jobs in this area. Demand for shapes has improved but fabricators could absorb considerable additional business.

The cast iron pipe market is slow with no important projects up for immediate consideration. Potential demand in the Pacific Northwest is large as soon as existing restrictions are lifted. A project near Pasco, Wash., involving about 400 tons, has been awarded to an unstated supplier. Seattle has an improvement project for Eighth avenue S. W., tonnage unstated. Additional housing projects will soon call for cast iron pipe and other items. Among them is a $15,000,000 job at Port Orchard, Wash., designed to serve employes of the Puget Sound navy yard.

Progress is being made toward proposed reconstruction of the Narrows bridge near Tacoma, destroyed two years ago. Technical experts working with the Washington Toll Bridge Authority, have approved general design plans for the proposed structure. They were developed by C. E. Andrew, designing engineer for the authority and call for four traffic lanes on a concrete deck. Towers are to be 58 feet higher than the original and the entire design is expected to overcome the conditions which wrecked the first bridge. At the center the cables

Speeding Destruction

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are planned to be 507 feet above mean low water, the span to have truss girders which will hang 33 feet below the bridge. Much detail work is yet to be done and no definite plans have been made as to when construction will be undertaken. It is expected to be immediately after the end of the war.

Canada . . .

Toronto, Ont.—New business continues brisk with no major cancellation following announcement that many lines of war material production are to be sharply curtailed. Most buying is through government purchasing agencies or war plants and other consumers that have not been affected by slowdown action, with the result that steel on order, as well as new contracts, is being directed to industries that are speeding up operations, including shipbuilders, aircraft plants, radio and rolling stock builders. About the only curtailment in demand recently has been that for special alloy steel for gun manufacture and it is stated that there is a surplus of this material; structural shapes for building operations, and wrought iron pipe. Steel demand from machinery and tool manufacturers has shown a sharp drop since the turn of the year, and it is stated that there is a surplus of tools. Insofar as the major Canadian steel producers are concerned, however, incoming orders are well sustained with a substantial part of new buying for delivery well into third quarter, and backlogs are increasing steadily.

Department of munitions and supply announced that applications may be obtained through it whereby authorized Canadian government agencies and institutions may acquire maintenance, repair and operating supplies from the United States through Controlled Materials Plan Regulation No. 5A. The use of the plan, however, is subject to any conditions included in the authorization by WPB. This amendment is similar to a provision for Canadian industries which have been included in CMP.

With the new shipbuilding program now definitely under way, demand for plates and other types of steel on this account is becoming more insistent. Mill representatives report increasing flow of plate orders as specifications are released, with the greater part of new placements coming direct from the department of the steel controller.

Local mill representatives report a steady outpouring of orders for carbon bars, with bookings extending to the end of third quarter. No cancellations of carbon bar orders have developed, but in some quarters there appears to be uneasiness in this respect. Demand for special alloy steel bars for gun manufacture has dropped sharply in the past two or three weeks, and warehouse operators that have obtained fairly large stocks of this type of steel are looking for buyers. However, it is not expected the surplus supply will hold for long as electric furnaces are swinging production to other materials for which heavy demand persists.

More action has developed in merchant pig iron, with a number of buyers placing orders for quick delivery. One local melter put in a rush order for 200 tons of foundry iron and it is stated that other orders ranging from 100 to 300 tons were more numerous. For some time most deliveries have been confined to one or two cars, but there appears to be easing in pig iron supply recently and deliveries have been better.

Nonferrous Metals . . .

Nonferrous Metals Prices, Page 115

New York — Delivery schedules for copper allocated for June are for the most part determined. Fabricators and brass foundries with larger scrap reserves will receive correspondingly less new copper and the reduction in some instances will be substantial. Those brass mills rather heavily stocked with some grades of copper and brass scrap will get less copper for delivery next month, forcing them to dip further into these scrap stocks. Included are brass clippings, brass rod turnings, cartridge cases. Some have withdrawn from buying these grades of scrap which are backing up at ordnance plants.

Aggregate tonnage of copper required each month varies little, but distribution is subject to scrap inventories. Little nonferrous scrap has been returned from the battlefields. When arrivals reach large proportions, new problems in cleaning and scrap analysis will confront melters.

Purchase of inactive stocks of unused and undamaged copper and copper-base alloy pipe and tube fittings is being

FOR ACCURACY TO 1/1000 INCH

★ It's precision plus for all Horsburgh & Scott Worms and Worm Gears . . . glass-hard thread surfaces of the worms are ground all over on our exclusive precision grinders to an unexcelled accuracy of less than .001" on both indexing and lead . . . gears are generated by a cutter that is an exact duplicate of the mating worm . . . and then precision inspection. H & S worms and worm gears are the finest obtainable.

Send note on Company Letterhead for 488-Page Catalog 41

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

arranged by WPB. When possible these will be used in present form, but if necessary will be remelted for war needs. For remelting, 20 cents a pound will be paid for cast brass and bronze pipe and tube fittings, 27½ cents for wrought copper fittings. Holders of idle stocks have been asked to report them.

Consumption of manganese bronze for ship-building, notably propellers continues high, although installation of degaussing cable on ships now in operation has been completed. The new ships have the magnetic mine repelling system built into the hulls.

Prime western zinc is slightly tighter, but brass mills and other consumers are amply covered for June on high grade. Some galvanizers have not used each month all zinc alloted them, requirements being regulated by steel given them for coating. Brass scrap inventories are also a factor in allotments. Bulk of zinc consumers are not contracting for material beyond 30 to 60 days; deliveries are dependent on allocation certificates each month. Flood at mines have reduced output and it will be some weeks before operations are again normal.

To correct some inequities in use of tin under the conservation policy, a few technical changes have been made as reported on page 39 of this issue. Production of fine tin by the Patino mines is expected to increase this year to around 14,500 English tons as compared with 13,491 tons last year.

MARVEL 9A (capacity 10" x 10") Cutting-off shafts at the Monarch Tool Co.

FINE MACHINE TOOL BUILDERS KNOW THEIR MACHINE TOOLS!

When the Monarch Machine Tool Co., builders of Monarch Precision Lathes, needed another cutting-off machine, they chose a MARVEL 9A Production Saw . . . one of MARVEL'S new heavy-duty, all-ball-bearing sawing machines with automatic bar push up. These are the fastest saws built —will cut off more pieces, floor-to-floor, from single or nested bars than any other.

Buy from your local distributor.

MARVEL SAWS

ARMSTRONG-BLUM MFG. CO. "The Hack Saw People"
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Equipment . . .

Boston—All machine tools on order for the tooling of a new air-cooled aircraft engine plant in the East are rescheduled and routed ahead of everything else, to expedite production facilities at the factory. Builders with orders for this plant have revised schedules and some machines have been pushed back. The tools for this plant were placed some time ago and little new buying has developed, but the first urgency number assigned was too low; now it supersedes all.

New buying has slackened and shipments have slowed slightly, although the latter hold relatively high, well in excess of purchases. New volume has no doubt been affected, at least psychologically by talk of cutbacks in machine tools, but backlogs have not felt this as yet by any material increase in withdrawals or cancellations. Deliveries are improving on most standard tools, but some recent buying of small-sized automatic screw machines, based on better shipment, has extended these to three months with one shop. Larger sizes are still tight.

Subcontracting continues to ease; at least three machine building shops are engaged on war contracts outside regular tool assembly. Some lathe, drill and milling machine builders have reduced backlogs materially, with deliveries near normal; several are in line for other war contracts. Bearings are now about the tightest item in supplies. Steel is easier and more NE grades are going into machines. Restrictions on the use of new motors have been eased slightly. Motors cannot be stocked by machine builders, who are among the largest users of small power units. With tool requirements declining, the tight situation in motors may be slightly relieved.

New York—Most machine tools on order are high on urgency lists and the much-publicized cutback order has had only slight effect on backlogs to date; a few cancellations have appeared, but cancellations have dribbled in for some time, revolving around program changes, and to what extent the scattered new stop orders are traceable to the new order is a matter of conjecture. New buying is affected and has slackened further. On the whole, few units on books are expected to be lost. For some months the process of redistricting new purchases to essential needs has automatically worked as a cutback through urgency classifications. While some tools may be dropped, the remaining backlog of the industry is almost 100 per cent highly rated for war production.

"No reduction in aircraft tooling now planned is considered probable; in spots demand may increase. With new orders substantially under shipments, a situation which has prevailed for more than six months, backlogs steadily decline and with some shops are nearly depleted; more builders are taking on contracts outside machine assembly and others are registering equipment for such work. Deliveries are improving, but spottily; one New England shop can deliver some units from stock, while others are extended to 10 months delivery.

Pool buying has halted and new orders are for one or two tools at a time with an absence of large lists up for estimates.

DON'T OVERLOAD!

Overloading is dangerous—while today abuse to machinery is akin to sabotage.

INSPECT REGULARLY!

Don't neglect your WRIGHT HOISTS. Make them last longer by regular and proper maintenance.

OIL REGULARLY!

Get busy with the grease gun! Your WRIGHT HOIST will last indefinitely if you treat it right.

WATCH LOAD HOOK!

Wright hooks are made to open slowly as visible warning against overloading. Watch them.

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Believe it or not, muster, a well-lubricated load chain will outlast a dry chain *fifteen times.*

Send today for a free copy of the Wright Crane Signal Chart. This chart (36″ x 24″) can be tacked up on the bulletin board to teach the men standard crane signals which will speed operation and promote safety.

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Horizontal drive, made in 35 sizes in ratios of 10 to 1200:1 and from ¾ to 75 horsepower.

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Horizontal drive—made in 13 sizes in ratios of 1¼ to 9¼:1 and from ¾ to 50 horsepower.

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War time requirements make the D.O.James Motorized Reducers a very important *Must* in solving and meeting the power-saving needs of modern industry. Their accessibility and compactness make them most desirable when floor space is limited. Their soundness of design and manufacture insures maximum efficiency with minimum maintenance.

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MAKERS OF ALL TYPES OF GEARS AND GEAR REDUCERS

NEW BUSINESS

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

SUB-CONTRACT OPPORTUNITIES

Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.

Philadelphia Office, Contract Distribution Branch, Production Division, WPB, Broad Street Station building reports the following subcontract opportunities:

Buescher-18-1: A Pennsylvania concern requires facilities for taper boring hub and cutting keyway in eight rudder crossheads for steering gear. Requirements, first forging available by August 1, then one every two months until completion. Equipment required, 12-foot boring mill 2-foot 9-inch bar travel, hydraulic slotter 32¼-inch stroke. Material, steel forgings. Navy specification 49S2, class AN, furnished by prime contractor. Tolerance, taper bore .003, keyway .001. Overall dimensions, 4 feet 8 inches wide x 2 feet 9 inches deep, 10 feet long. Prints at Philadelphia office.

Buescher-18-2: A Pennsylvania concern requires facilities to machine ram assembly for steering gear. Requirements, first forging available by August 1, then one every two months until completion. Equipment, planer 18 x 4-foot bed 38 inches under head, engine lathe 18 feet between centers to swing 44 inches, hydraulic slotter 30-inch stroke, horizontal boring mill 3-inch bar 30-inch table travel. Material, steel forgings, Navy specification 46S4 INT, to be furnished by prime contractor. Overall dimensions, 17 feet 8 inches x 2 feet 4 inches x 3 feet 2 inches. Prints at Philadelphia office.

Buescher-19-12: A government agency requires 900 oil pump gears (600 drivers and 300 driven gears). Delivery 90 days after date of contract. Driver dimensions, O.D. 1.795 inches x 2 5/16-inch. Driven dimensions, O.D. 1.795 inches x 1.439 inches, 16 teeth 10 pitch. 1.6-inch minus .001 P.D., special form, 25 degree pressure angle. Material, SAE 3125CH.NI steel, sclerescope 33-38. Prints at Philadelphia office.

Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:

SC-95: External and internal thread milling work for machines having capacity 1⅝-6 threads. Material, brass, blanks supplied by prime contractor. Quantity, 4000. Early delivery. High rating. Reference, 1-A-1021.

Chicago office, Contract Distribution Branch of WPB, 226 West Jackson Boulevard, is seeking contractors for the following:

Galvin Mfg. Corp., 4301 Madison street, Chicago, attention C. J. Jensen. Priority, AA-1. Pump cylinder tube. Contractor will assist in obtaining material, which is brass. Quantity, 5000. Dimensions ⅛ x 3 inches. Equipment, ⅝-inch capacity single-spindle automatic screw machine, internal and external honing machine.

Galvin Mfg. Corp., 4301 Madison street, Chicago, attention C. J. Jensen. Priority, AA-1. Gas line bushings. Contractor will assist in obtaining material, which is brass. Quantity, 1500 each of two sizes, ½ x 1¼ and ½ x 2 inches. Equipment, turret lathes 1½ and 2½-inch bar capacity, 6 x 14-inch T. T. hand milling machine, 3/16-inch dr. capacity two-spindle bench drill.

Ilg Electric Ventilating Co., 2850 North Crawford avenue, Chicago, attention W. H. Hallsteen. Priority, AA-1. Job covers machining of motor frames, two sizes, one of cast iron and the other of rolled steel. Contractor supplies material. Other jobs of similar nature to be let by this contractor. Quantity, 1000. Dimensions, 6 x 9½ inches. Equipment, 24-inch vertical boring mill.

Metal Specialties Mfg. Co., 3200 West Carroll avenue, Chicago, attention A. M. Pien. Priority, AA-1. Inner shell, cover and plug, 50,000, 10,000 and 2800, respectively. Subcontractors desired within 200 miles. Contractor supplies material, which is hot-rolled and cold-rolled steel. Equipment, two and three-inch capacity automatic screw machines, 1 and 1¾-inch bar capacity turret lathes.

Naxon Utilities Corp., 2101 West Walnut street, Chicago, attention S. S. Segal. Union and retainer, alloy steel. Quantity, 1,750,000 of each. Production requirements vary from 5000 to 135,000 per day. These are typical of others to be subcontracted. Runs are continuous, delivery in the future considered. Contractor supplies materials and special tools. Equipment, ⅞-inch capacity four-spindle automatic screw machines.

Victor Adding Machine Co., 3900 North Rockwell street, Chicago, attention E. T. Hurley. Priority, AA-1. Stud ball, of tool steel. Production requirements, 500 per month, beginning August 1. Subcontractors within 200 miles preferred. Subcontractor does entire job, including furnishing material. Quantity, 3700. Dimensions ¼ x ½-inch. Equipment, ⅝-inch bar capacity turret lathe, hardening equipment, ¼-horsepower bench polishing and buffing machine.

Schwitzer-Cummins Co., 1125 Massachusetts avenue, Indianapolis, Ind., attention A. N. Phillips. Priority, AA-1. Water pump packing nuts. Contractor will assist in obtaining material. Quantity, 1000 each of two types. Dimensions 1½ x 1 inch. Equipment, die-making and stamping equipment, 1¾-inch bar capacity turret lathe.

New York office, Contract Distribution Branch of WPB, 122 East Forty-Second street, New York, reports the following subcontract opportunities:

S-20-22827: A Brooklyn, N. Y., manufacturer desires a subcontractor with a large lathe having 2-foot swing and 40 feet center to center, to turn main shafts for ships. Work will be available during July, August and September.

S-20-1: A Rochester, N. Y., company is in need of a subcontractor with turning capacity for 1000 units per day of the following pieces: SAE 1025 cold-rolled tubes to be turned I.D. 8-inch piece long x 2¼ x 1¼-inch to be bored 1½ x 4½-inch, 1.6 x 1.4-inch, 2 x .75 inch, by steps. Turn O.D. 1.75 x 4½-inch, 2 x 1.25-inch, 2.390 x .75-inch in steps. Tolerance, plus .008. Material furnished by prime contractor.

STRUCTURAL SHAPES . . .

SHAPE CONTRACTS PLACED

750 tons, for undisclosed project in Pacific Northwest, to Pacific Car & Foundry Co., Seattle.

200 tons, miscellaneous small projects, to Pacific Car & Foundry Co., Seattle.

REINFORCING BARS . . .

REINFORCING STEEL PLACED

6000 tons, floating drydocks to be built in Delaware, to Carnegie-Illinois Steel Corp., Pittsburgh; V. P. Loftus, Charlotte, N. C., contractor.

3000 tons, for Tacoma's second Nisqually power project, to Northwest Steel Rolling Mills, Seattle.

200 tons, warehouses, Newark, N. J., to Ceco Steel Products Co., Newark; Walter Kidde Constructors Inc., New York, contractors.

REINFORCING STEEL PENDING

425 tons, buildings, navy station, Lido Beach, N. Y.; William L. Crow Construction Co., New York, contractor.

PIPE . . .

CAST PIPE PLACED

400 tons, for United States engineer project, Pasco, Wash., to undisclosed interest.

CAST PIPE PENDING

Unstated, Eighth avenue S. W. improvement, Seattle; Valley Construction Co., low at $43,482, for general contract.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Chesapeake & Ohio, ten 2-6-6-6 Mallet type freight locomotives, to Lima Locomotive Works, Lima, O.; delivery to start in first quarter, 1944.

LOCOMOTIVES PENDING

Chicago, Rock Island & Pacific, ten 4-8-4 type locomotives; purchase authority granted by district court at Chicago.

CONSTRUCTION AND ENTERPRISE

OHIO

CLEVELAND—Cleveland Steel & Pipe Co. has been incorporated by Ezra Z. Shapiro, Samuel K. Walzer and Leon M. Ascherman, N.B.C. building, the latter named as statutory agent.

CLEVELAND—National Concrete Fireproofing

FOR SALE in Boston

300,000 SQ. FT. FOR YOUR NEW ENGLAND DISTRIBUTING AND MANUFACTURING PLANT

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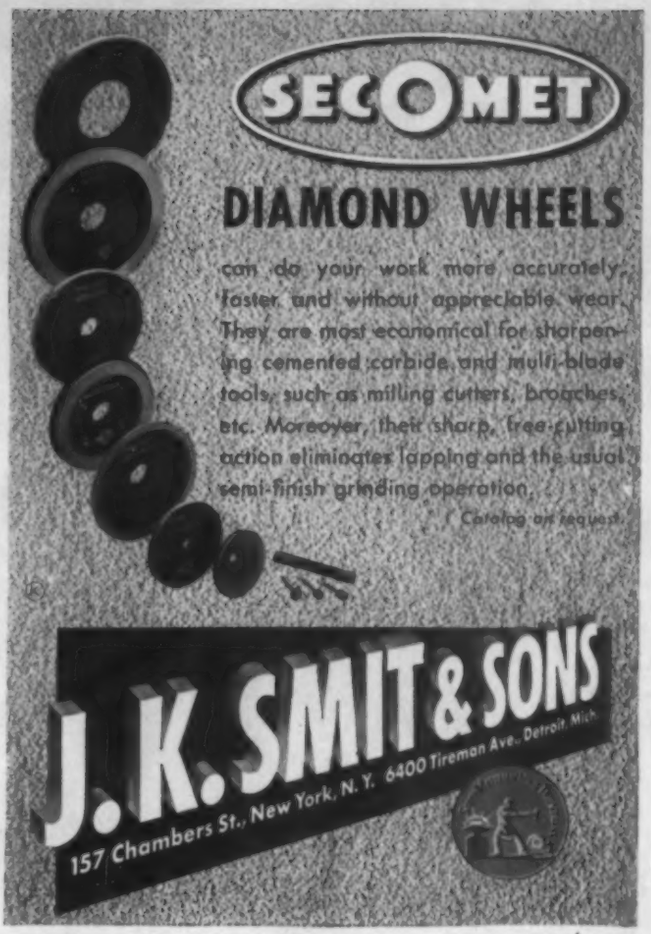
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can do your work more accurately, faster and without appreciable wear. They are most economical for sharpening cemented carbide and multi-blade tools, such as milling cutters, broaches, etc. Moreover, their sharp, free-cutting action eliminates lapping and the usual semi-finish grinding operation.
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IS SERVING TO INCREASE PRODUCTION IN WAR PLANTS ALL OVER THE COUNTRY. IT IS BEING USED IN THE CLEANING OF CASTINGS, FORGINGS, HEAT TREATED METAL PARTS, SHELLS, BOMBS AND ARMOR PLATE. "CLEANBLAST" MAINTAINS PRODUCTION AND CONSISTENTLY REDUCES CLEANING ROOM COSTS.

ALLOY METAL ABRASIVE COMPANY

311 W. HURON ST. ANN ARBOR, MICHIGAN

Co., 850 Euclid avenue, has contracted for erection of seven factory buildings at Evansville, Ind., for Republic Aviation Co., to cost $1,125,000.

CLEVELAND—High Level Screw Products Co., recently incorporated, has taken over the former Premier Wire Works plant, 2114 Superior Viaduct. Paul Mancino, 513 Public Square building, is statutory agent and one of the incorporators.

CLEVELAND—Hickok Electrical Instrument Co., Robert Hickok, president, 10510 Dupont avenue, has been granted priorities for plant additions. Plans include a two-story addition 45 x 100 feet, increased from original plans for 29 x 94 feet. Cost is estimated at $70,000.

KENT, O.—Davey Compressor Co., 266 North Water street, is moving all departments to the former Erie car shops, which the company has purchased. Includes two buildings 55 x 330 feet and 55 x 250 feet, with 12 acres of ground.

MEDINA, O.—Henry Furnace & Foundry Co., 340 Medina street, has been acquired by new owners, Leonard Roof, Cleveland; Thomas Kaplin, Toledo, O.; Jay Levine, New York. Herbert F. Bradway has been retained as manager.

MIDDLEFIELD, O.—Geauga Die & Mold Co. has acquired a site from Johnson Rubber Co. and will erect a new plant at once.

MIDDLETOWN, O.—Fremak Engineering Co. has been incorporated by Lester McKay, Ervin Frisch and Maxwell Finkleman, 405 Middletown Deposit building, to manufacture machining tools, dies, metal jigs and specialties.

MASSACHUSETTS

LEOMINSTER, MASS.—Standard Tool Co., 75 Water street, has plans by S. W. Haynes & Associates, 336 Main street, Fitchburg, Mass., for a three-story plant addition 42 x 54 feet, to cost about $40,000.

PENNSYLVANIA

ERIE, PA.—Keystone Crankshaft Corp., 1111 Bacon street, manufacturer of machine tools for finishing crankshafts, for several months engaged in war work, has been sold to Pittsburgh investors, who will expand facilities.

MEADVILLE, PA.—Burdick Mfg. Co., manufacturer of airplane parts, has bought the former Hoppenstand Industries Co. plant at Cambridge Springs for $65,000 and will move its main plant there. Lawrence H. Burdick is president.

ILLINOIS

AURORA, ILL.—Barber-Greene Co., manufacturer of construction equipment, is expanding by erection of a two-story addition.

CHICAGO—Dole Valve Co., 1923 West Carroll avenue, manufacturer of thermostats, valves, and screw machine products, is building a plant addition.

CHICAGO—Bendix Aviation Corp., Illinois Division, manufacturer of airplane carburetors, is making extensive alterations to the plant it recently acquired here.

CHICAGO—Era Tool & Engineering Co., 4555 West Addison street, is building a large addition to its plant for manufacture of tools, dies, gages and special machinery.

CHICAGO—L. A. Young Spring & Wire Mfg. Co., 6601 South Oak Park avenue, has retooled its plant for war production, ordnance pieces for the Army.

CHICAGO—Fred W. Gehrer Co., 3262 West Grand avenue, metal manufacturing, has made a substantial addition to its plant.

CHICAGO—James P. Marsh Corp., 2073 North Southport avenue, manufacturer of recording technical devices has expanded its plant.

CHICAGO—Superior Tool & Stamping Co., 4519 West Madison street, manufacturer of precision tooling, is building a large plant addition.

CHICAGO—Douglas Aircraft Co. Inc., which has had under construction a building 4000 feet long, with two million square feet floor space, has been authorized to expand these facilities, to manufacture heavy cargo planes.

NORTH CHICAGO, ILL.—Promat Division of Poor & Co., manufacturer of rustproofing materials, is building a plant addition.

ROCKFORD, ILL.—Free Sewing Machine Co. plans construction of a one-story factory addition 45 x 65 feet. A. R. Eastman, Rockford Trust building, is architect.

MARYLAND

BALTIMORE—Progressive Brass Die Co. Inc., 118 West Pratt street, has installed additional equipment to cope with expanding business.

BALTIMORE—Dixie Mfg. Co. Inc., 1310 Russell street, manufacturer of dust-collecting systems and similar products, is building a warehouse to release plant space for manufacturing.

BALTIMORE—Allied Aviation Corp., Turners Station, near Dundalk, manufacturer of specialized aircraft plastic parts, is building a two-story addition for its engineering department. Company has bought additional plant in the South for production purposes.

BALTIMORE—Rheem Mfg. Co., Sparrows Point, Md., will build large storehouse. Company recently removed its Newark, N. J., plant to that city. Usually producing metal containers and similar products is now wholly on war work.

KENTUCKY

LOUISVILLE, KY.—Defense Plant Corp. has completed contract with Reynolds Metals Co., Louisville, for a plant in Kentucky to cost $300,000. Overall commitment to this company now is $5,000,000.

AIR FILTRATION AAF DUST CONTROL

THE SYMBOL of Clean AIR

American Air Filter dust control and air filtration equipment is in general use in every field of American Manufacture—reducing operating costs, eliminating dust hazards, accelerating production and protecting quality. Many of the phenomenal achievements of precision manufacturing and the development of most of the new synthetic products have been made possible by American Air Filter dust control.

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GRUENDLER "STEEL TURNINGS" CRUSHER

Large quantities of long steel and high carbon steel turnings, long coils of brass alloys can be readily reduced to uniform "chips" which are easier to handle, bringing a higher price.

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years since 1892—and today we are still making quality gears and continue to distribute Ramsey Silent Chain Drives and Couplings. In war and peace Simonds Gears have stood the test of time and wear—that is why they are so widely used everywhere.

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DUE TO WAREHOUSE SERVICE!

A tank factory needed steel shafts in fifteen days! Bissett accepted this order . . . and beat the promise! Perhaps a similar problem in *your* plant can be solved by Bissett engineers.

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N.E. Steels and Standard S.A.E. Steels, both Carbon and Alloy, Hot Rolled and Cold Drawn • Chisel Steels • Cumberland Ground Shafts • Drill Rod • High Speed Tool Bits • Shim Steels • Tool Steels • Tool Steel Tubing • Boiler Tubing.

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At present there are stocks in Worcester, Akron, Chicago, and Los Angeles.

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WORCESTER • MASSACHUSETTS

NEW YORK AKRON CHICAGO LOS ANGELES

MISSOURI

KANSAS CITY, MO.—Prier Brass Mfg. Co., manufacturer of plumbing brass products, has let contract to Miller-Stauch Construction Co., Railway Exchange building, for a one-story factory building 25 x 193 feet.

WISCONSIN

CAMBRIA, WIS.—Cambria Canning Co. has let contract to Rohde & Kapelle, Mayville, Wis., for a one-story boiler plant 30 x 50 feet. Arthur Kuenzi, Watertown, Wis., is engineer.

PORT WASHINGTON, WIS.—Wisconsin Chair Co. has plans by R. A. Sutherland, 259 East Wells street, Milwaukee, for a four-story factory building 35 x 100 feet.

GREEN BAY, WIS.—Hudson-Sharp Machine Co., manufacturer of paper converting machinery, has let contract to J. C. Basten for a one-story plant addition.

KENOSHA, WIS.—Kelvinator Corp., 5625 Twenty-fifth avenue, has awarded contract to Lindemann Construction Co., 4724 Fifth avenue, for alterations to its chemical and physical laboratory building, to be financed by Defense Plant Corp., Washington.

MADISON, WIS.—Ray-O-Vac Co., manufacturer of dry batteries and flashlights, has let contract to J. H. Findorff & Son for a one-story plant addition and alterations to existing plant.

SEYMOUR, WIS.—Seymour Canning Co. has let contract to Selmer Co., Northern building, Green Bay, for a plant addition 18 x 52 feet and 10 x 113 feet.

MINNESOTA

ST. PAUL, MINN.—Twin City Testing & Engineering Laboratory Inc. is taking bids on general contract for a one-story laboratory building 40 x 120 feet at Franklin and Cromwell avenues. Toltz, King & Day Inc., Pioneer building, are architects and engineers.

MINNEAPOLIS, MINN. — Midwestern Metal Products Co., Peter J. Plater, president, tool manufacturer, 1420 South Seventh street, is taking bids for a one-story factory 40 x 120 feet at 2648 Thirty-seventh avenue South. Walter R. Dennis, 1108 Nicollet avenue, is architect.

TEXAS

DALLAS, TEX.—Universal Corp., care J. P. Travis, 2625 Elm street, is having plans drawn by W. W. Alschlager, architect, Southland Life building, for two plant buildings, 100 x 437 feet and 100 x 107 feet, at cost of about $1,000,000. (Noted March 8).

KANSAS

GARDEN CITY, KANS.—Cities Service Co., W. Alton Jones, president, 60 Wall street, New York city, plans 200-mile natural gas pipe line between Guymon and Blackwell, Okla., to carry gas to Kansas City, Mo., to cost about $15,000,000. Work to start 30 days after WPB approval.

KANSAS CITY, KANS.—Arthur Ek has let contract to Louis Dreier for a one-story machine shop 50 x 50 feet.

SOUTH DAKOTA

TINTON, S. D.—Black Hills Tin Co., Ross Beatty, Chicago, proprietor, has started rebuilding mill recently burned. A. E. Anthony is construction superintendent.

NEBRASKA

NEBRASKA CITY, NEB.—E. Gaskill, city clerk, has plans for waterworks improvements, including water treatment plant, elevated tank on tower and additional mains. Cost estimated at more than $30,000. Henningson Engineering Co., Standard Oil building, Omaha, Neb., engineer.

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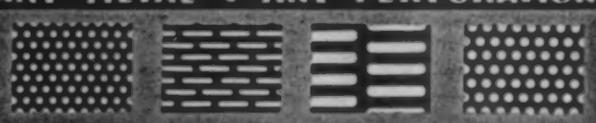

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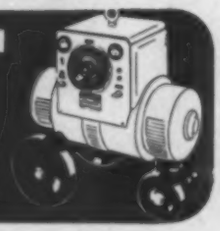

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IOWA

CEDAR RAPIDS, IOWA—Wilson & Co. Inc., meat packer, has been given a permit for construction of a plant addition to cost about $160,000.

CEDAR RAPIDS, IOWA—Iowa Mfg. Co., manufacturer of rock and gravel crushing and screening machinery, has let contracts for a one-story plant addition 98 x 137 feet.

NEWTON, IOWA—Maytag Co., manufacturer of washing and ironing machines, has given contract to Arthur H. Neumann & Bros. Inc., Hubbell building, Des Moines, Iowa, for a one-story addition to its aluminum foundry, 90 x 180 feet. Proudfoot, Rawson, Brooks & Borg, Hubbell building, Des Moines, are architects.

CALIFORNIA

BERKELEY, CALIF.—Linde Air Products Co., 1150 Eighth street, has awarded contract for a factory building to Swinerton & Walberg, 225 Bush street, San Francisco.

CUCAMONCA, CALIF.—Buehler Tank & Welding Works has been formed by Walter P. Buehler and associates to establish a plant here.

LOS ANGELES—California Cornice & Steel Corp. will build an addition to its plant at 1611 Naud street, 40 x 100 feet, to cost $6000.

LOS ANGELES—Emsco Derrick & Equipment Co., 6811 South Alameda street, will build an office building 21 x 44 feet.

LOS ANGELES—Aluminum Co. of America is having plans made for a two-story utility building at 5151 Alcoa avenue, of reinforced concrete, to cost about $250,000.

LOS ANGELES—Wolverine Steel Products Co. has been established by Milton Simon, to conduct business at 815 South Hill street.

LOS ANGELES—Alloy Steel & Metal Co., 1862 East Fifty-fifth street, is building a warehouse 40 x 70 and 20 x 40 feet, to cost about $4500.

LOS ANGELES—F. L. Ferguson Rapid Precision Tools has been formed by Frederick Lee Ferguson to conduct business at 4217 West Jefferson boulevard.

LOS ANGELES—Central Aircraft & Engineering Co. has been established by A. Frank Ruppenthal and George C. Woods and will conduct business at 904 North Cienga boulevard.

SAN DIEGO, CALIF.—Aero Screw Co. has been organized by Arthur M. Householder and Albert P. Moffei, to conduct business at 2050 National avenue, San Diego.

SANTA MONICA, CALIF.—Douglas Aircraft Co., 3000 Ocean Park boulevard, will build a plant addition at 2901 Exposition boulevard, 230 x 510 feet, to cost about $213,000.

OREGON

PORTLAND, OREG.—Monarch Forge & Machine Works, N. W. Twenty-first place and York street, is building an office and warehouse addition 60 x 200 feet and 40 x 67 feet, to cost about $35,000.

WASHINGTON

CENTRALIA, WASH.—Northern Pacific Railroad is rebuilding its local coal bunker plant and will install new auxiliary equipment.

SEATTLE—Fentron Steel Works, 1401 West Garfield street, has let contract to Fulton Construction Co. for a plant addition 30 x 35 feet, to cost about $10,000.

CANADA

LIVERPOOL, N. S.—Thompson Brothers Machinery Co. Ltd., Water street, has had plans prepared for further plant addition here to cost, with equipment, about $15,000.

CHIPPEWA, ONT.—Norton Co., head office Worcester, Mass., has had plans prepared for plant addition here to cost about $35,000. H. J. Daly is local manager.

FORT ERIE, ONT.—Department of Munitions and Supply, Ottawa, R. T. Donald, secretary, in association with company here whose name is withheld, is having plans prepared by Allward & Gouinlock, architects, 57 Bloor street west, Toronto, for construction of large assembly unit to local plant, estimated to cost, with equipment, about $100,000.

LONDON, ONT. — Canada Vulcanizer & Equipment Co. Ltd., 1109 York street, has called tenders and awards will be let soon for construction of addition to the Unifin Tube Division, to cost about $10,000.

NIAGARA FALLS, ONT.—Oneida Community Ltd., Ontario Road, has had plans prepared and will let contracts soon for construction of one-story plant additions 20 x 40 feet; 20 x 23 feet and 40 x 50 feet, to cost about $20,000; equipment extra.

TORONTO, ONT.—Seiberling Rubber Co. Ltd., 99 Paton road, has called tenders for construction of plant addition, two stories, 100 x 200 feet, to cost $80,000.

TORONTO, ONT.—W. D. Beath & Son Ltd., 394 Symington Avenue, steel drums, hoists, etc., has had plans prepared for construction of new plant building to cost about $10,000.

TORONTO, ONT.—Foundation Co. of Ontario Ltd., 1158 Bay Street, will build addition to machine shop at 406 Weston Road, to cost about $10,000.

TORONTO, ONT.—Compressed Air Equipment Ltd., 300 Howland avenue, has had plans prepared and will start work soon on plant addition one story, 40 x 54 feet, to cost about $8000, equipment extra.

TORONTO, ONT.—W. D. Beath & Son Ltd., 394 Symington avenue, has given general contract to J. Robert Page, 18 Toronto street, and work will be started immediately on plant addition to cost, with equipment, about $15,000.

TORONTO, ONT.—John Inglis Co. Ltd., 14 Strachan avenue, has extended contract to A. W. Robertson Ltd., 37 Bloor street west, for further alterations and addition to Colt gun plant near Ordnance street, to cost about $25,000.

TORONTO, ONT.—Metal Stampings Ltd., 3600 Danforth avenue, has given general contract to R. J. Hibbs Construction Co. Ltd., 15 Trent avenue, for construction of plant addition comprising two buildings, estimated to cost about $35,000.

TORONTO, ONT.—Canadian General Electric Co. Ltd., 212 King street West, is having plans prepared by Beck & Eadie, architects, 220 Bloor street West, for construction of addition to Edison Lamp Works, 189 Dufferin street, to cost, with equipment, about $250,000.

BEAUHARNOIS, QUE.—St. Lawrence Alloys & Metals Ltd., will proceed with rebuilding of plant here recently destroyed by fire with loss estimated at $25,000.

LONGUEUIL (MONTREAL), QUE.—Cameron Grant Inc., care of Heroux Machine Parts Ltd., 73 Chambly road, plans to build machine shop here, estimated to cost about $40,000.

MONTREAL, QUE.—Crane Limited, 3800 St. Patrick street, is having plans revised for construction of pipe plant to cost about $375,000, for which Anglin Norcross, Quebec, Ltd., has been given general contract.

MONTREAL, QUE.—Shell Oil Co. of Canada Ltd., Sherbrooke street East, has given contract to Atlas Construction Co. Ltd., 679 Belmont street, for construction of super-structure for new cracking unit at the Montreal East refinery. Estimated cost $60,000.

MONTREAL, QUE.—Canadian Car & Foundry Co. Ltd., 621 Craig street west, has given general contract to Foundation Co. of Canada Ltd., 1538 Sherbrooke street west, for further addition and alterations to the Point St. Charles works, St. Patrick street, to cost, with equipment, about $65,000.

STE. THERESE, QUE.—Commonwealth Plywood Co. Ltd., has received tenders for construction of plant addition here to cost about $25,000 and awards will be made soon.

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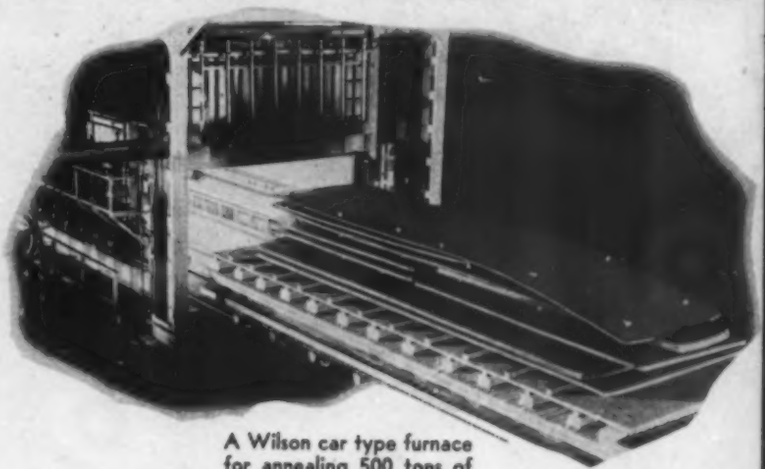
WHEN THE HEAT'S ON..

WHEN the heat's on and Jap Zeros are falling out of the sky like shattered clay pigeons, it's a sure bet that 4.7's barrels and armor plate that were heat treated in a WILSON furnace are in the thick of it! The quality of service in Wilson equipment, so well known in the past, is still the thing to rely on when the *heat is on!*



A Wilson car type furnace for annealing 500 tons of armor plate per charge.
LUKENS STEEL CO., COATESVILLE, PA.

Six more furnaces for Lukens Steel Company under construction.

The Wilson ENGINEERING COMPANY, Inc.
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INDUSTRIAL FURNACES • RADIANT TUBE HEATING • HEAT TREATING PROCESSES

Sold for Taxes

Painting by Harold M. Kramer

IT IS a common thing for the poor people of Japan to sell their daughters . . . usually to satisfy the tax collectors for the Son of Heaven. What happens to these girls? Some of them go directly into the government owned houses of prostitution. But many of them are sold or leased to Japan's wealthy factory owners. They are regimented, trained, housed in huge jail-like dormitories . . . and made to operate modern machines for fourteen hours a day for such a pittance that years are required to earn their freedom.

Is this something *you* should worry about? Well, it's Japan's idea of an improvement on the "American Way" . . . and you can be sure you'll become much more intimately acquainted with it if we let America lose this war. The Japs have always thought America crazy to let workers share in the gains made through machine manufacture. They *know* what can be done to costs when machines are used to *enslave* labor. They laugh at the fact that Japan was able to flood our American stores with products "Made in Japan" despite *any* measures taken to resist the invasion. You can well imagine what American workers will face if a victorious Nippon dictates conditions in the future. The choice will be between starvation or competition with Japanese slave labor at *their* level of living. Nothing else. Cutler-Hammer, Inc., 1211 St. Paul Avenue, Milwaukee, Wisconsin.

One of a series of advertisements dedicated to a fuller appreciation of the stake each American has in victory

CUTLER-HAMMER
MOTOR CONTROL
C-H

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